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SERIES 3—Vol. 4, No. 8 AUGUST, 1921

AMERICAN JOURNAL OF OPHTHALMOLOGY

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Annual Subscription Ten Dollars in Advance,
Single Copies One Dollar.

Published Monthly by The Ophthalmic Publishing Company
7 West Madison Street, Chicago, Illinois.

Entered as Second Class Matter January 1st, 1918, at the Post Office, Chicago, Ill., under the act of March 3rd, 1879.

The British Journal of Ophthalmology

Ltd.

Founded 1917

Incorporating:

The Royal London Ophthalmic Hospital Reports (founded 1857)

The Ophthalmic Review (founded 1882)

The Ophthalmoscope (founded 1903)

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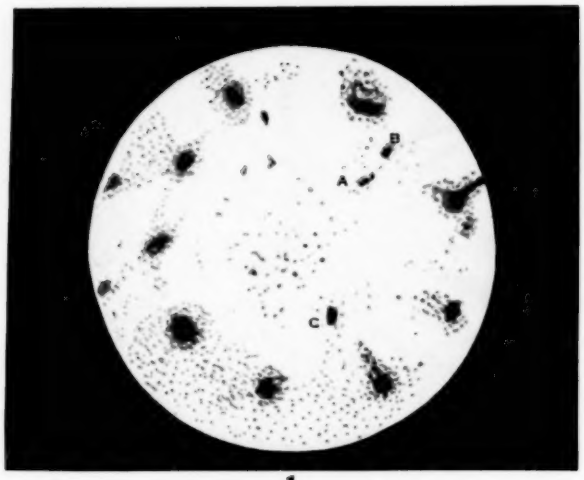
All subscriptions and inquiries concerning advertisements and other business matters to be sent to The Manager, British Journal of Ophthalmology, Ltd., 24 Thayer Street, London, W.

Printed and published for the British Journal of Ophthalmology, Ltd., by George Pulman and Sons, Ltd., at 24 Thayer Street, Marylebone, London, W.



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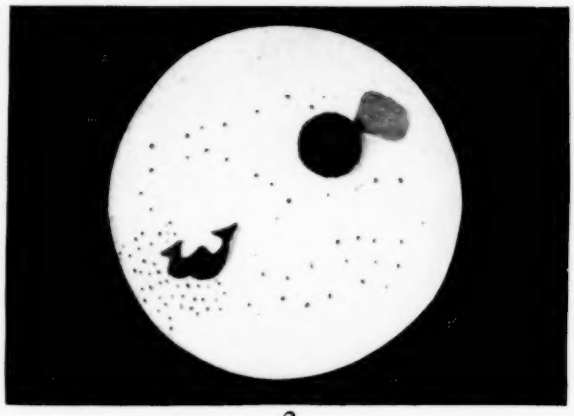

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SIDEROSIS OF THE CRYSTALLINE LENS. (VAN DUYSE AND DANIS)

1. RING OF YELLOWISH BROWN SPECKS WITH FINER SCATTERED ONES, MOSTLY SITUATED BENEATH THE ANTERIOR CAPSULE OF THE LENS. 2. THE DARKER SPOTS, A AND B, IN UPPER RIGHT QUADRANT OF FIG. 1 ARE MORE HIGHLY MAGNIFIED. THEY ARE SITUATED IN FRONT OF THE LENS CAPSULE. 3. MAGNIFIED VIEW OF DARK SPECK C IN LOWER RIGHT QUADRANT OF FIG. 1, BETWEEN RING OF LIGHTER SPOTS AND CENTER OF PUPIL.

AMERICAN JOURNAL OF OPHTHALMOLOGY

Vol. 5 • AUGUST, 1921 No. 8

TYPICAL SIDEROSIS OF CRYSTALLINE LENS. NO CLINICAL EVIDENCE OF A SPLINTER OF IRON.

PROFESSOR DANIEL VAN DUYSE, GAND.

AND

DR. MARCEL DANIS, BRUXELLES.

In the case here reported, a slight injury was followed after two years by evidences of siderosis and cataract. No scar of entrance and no foreign body could be discovered. But careful investigation seemed to show that a small splinter of iron had been retained in or near the crystalline lens. A definite discrimination is made between the rust spots underneath the anterior capsule and pigment spots upon its external surface.

The case here outlined was made the object of medicolegal investigation. The facts shown are of interest in practice.

CASE. M. A man of 45 years was wounded Nov., 1917, by a fragment of a casting thrown off in cutting a pipe. A certificate given at the time mentioned a contusion with wound of the right eye; but nothing more. Two years later one finds that the injured eye cannot see, that the crystalline lens is opaque with little brownish points on its surface arranged in a circle.

January, 1920, it is noted R. vision =fingers at 1.5 meters, hyperemic. The two irides have the same color; the right pupil dilates regularly with homatropin. Nine rust colored spots with diffused margins, partly concealed by the edge of the iris, are shown in the diffusedly opaque crystalline.

Two competent colleagues who examined the patient determined that the visual field is a little less than normal, that the deep membranes have not been affected and they noted an ocular tension of 30 mm. of mercury of the injured eye with intermittent orbital pain. The left eye had a tension of 18 mm. of mercury. They thought that a fragment of iron was dissolved in the anterior layers of the crystalline lens, that the iris was not discolored and that the vision was progressively changing.

In March 1920 the radiographic examination gave a negative result. Examination with the galvanometer practiced in May, 1920, was equally negative and the same was true of the examination with the giant electromagnet made in July, 1920.

1920, July 17. The left eye of M. (V.=0.9 with —1.50 D.) is normal. Its iris is in all respects similar to that of the wounded eye.

In the right eye light projected from the plane mirror is clearly and rapidly perceived in all directions. (Visual field without appreciable impairment. Integrity of the deep membranes.) As in former investigations no scar over the cornea is perceived, even when examined with the corneal microscope. There is no hyperemia of the eye, nor neuralgic pain. The tension is 18 mm. of mercury, the reaction of the pupil prompt, the anterior chamber diminished in depth.

By daylight the opaque crystalline lens, after dilatation by homatropin, is greenish-yellow. In both eyes one notices a relative hypoplasia of the lower segments of iris stroma, a species of broad incomplete coloboma, without any relation to the accident of 1917. The color of this segment is grayish and it is less pigmented than the remainder of the iris. On these are two spots (rust colored spots of the iris) having a russet brown color and caused by pigmentation of the anterior, vascular connective layer. Their particular character, the fact that they are bilateral in our patient shows they

have nothing in common with siderosis.

A second examination made August 7th, by means of the corneal microscope with the slit lamp illumination of Gullstrand, afforded the following notes:

Siderosis Spots. There exist at the level of the anterior surface of the crystalline a wreath of nine ocherous centers of a yellow brown with diffused borders consisting of a collection of dust in granules of a dark brown, more or less massed toward each other. Between these foci, especially below at the temporal side, are distributed fine spots of russet or gray brought out by the incidence of the light. They occupy also the central portion of the pupillary area of the crystalline. Between the peripheral ocherous foci is presented an appearance similar to that of the central area. Some spots are elongated toward the equator of the eye and partly covered by the pupillary margin of the iris. (See Color plate VIII, Fig. 1).

All of these spots, both large and small, are seated in the peripheral cortex of the crystalline lens under the anterior capsule, and they correspond to a more or less symmetric distribution of dust of the oxid of iron.

Pigment Spots. The small pigment corpuscles scattered in small numbers on the anterior capsule are clearly distinguished from the preceding by their localization in a more anterior plane and their darker color. With the low power of objective 55, one observes as A and B, Fig. 1, two dark granules. Under greater magnification, objective A-3, ocular 6, B takes more rounded form with a slightly roughened surface and a brownish tint, and joins a plaque of siderosis which is subcapsular and of yellowish tint. (Fig. 2.)

The other granule A takes an irregular form and a color similar to the first, with a dark brown nucleus. Some smaller epicapsular granules are found below and to the nasal side. (Fig. 2, Pl. VIII.)

A third corpuscle C takes, under the same enlargement, a triangular form with irregular outline. It has the same color as A and B, and is surrounded by little brownish granules. (Fig. 3, Pl. VIII.)

These pigment spots do not have their origin in siderosis. One can formulate the hypotheses of pigment proceeding from a pigmented pupillary membrane, from blood pigment or from uveal pigment.

Cataract. This is undergoing maturation of which the evidence is swelling of the crystalline, reduction of the anterior chamber, and the brilliance of the sectors having the appearance of asbestos, principally arranged between the ocherous foci of the wreath. In the center of the crystalline we find a large dull gray flake. The temporary increase of tension and hyperemia of the iris occuring some weeks before may be the effects of the initial swelling, rather rapid, of the cataract due to siderosis. At the begining it seems to have had the nature of cyclitis. One finds in any case a traumatic cataract by penetration of a foreign body which has not been accompanied by posterior synechia; something exceptional, according to Praun.

Pathogenesis of the Epicapsular Pigment Deposits. We can here in the absence of anatomic and histochemic examinations only formulate an hypothesis.

We are not unwilling to entertain the idea of remains of congenital pigmentation. They may assume the form of points,* filaments or membranes, the latter being more rare. Neither membranes nor filaments are visible here between the epicapsular deposits and the pupillary margin. Krückmann admits that the remains of pupillary membranes may consist of fixed points on the anterior capsule. If one raises the question of a uveal origin the location of the deposits excludes broken iritic synechiae. The illumination of Gullstrand of pigment cells here shows them more black, more like China ink. A cyclitis, if it existed, could cause migration of the uveal pigment and its precipitation on the anterior

*We remember that the late pigmentation of the tissue of persistent pupillary membrane is described in the same language as that of the iris stroma. Compare these punctate deposits and brown precipitates on the anterior capsule with two filaments of pupillary membrane represented by Peters (Fig. 15).

capsule by intermediation of leucocytes brought to the anterior chamber. On the other hand ocular contusion apart from inflammation may disturb the pigment of the iris, which fixed in tissue albumin may be deposited on the anterior capsule.

A traumatic hemorrhage might leave remnants of the blood fixed by the agglutination of the blood albumin. Thus Vogt and Schurmann have stated that pigment corpuscles similar to those under consideration and studied by the Gullstrand illumination, are found in the temporary epicapsular ring of Vossius. (precipitated hematic dust). Vogt described them as clotted, angular, ranging from dark yellowish red to brownish red, scattered and of irregular size and form. It is believed they should not be confused with the congenital pigment which is found on almost all anterior capsules, pigment assuming stellate form or having a rounded contour.

Spots of Subcapsular Siderosis. These spots are pathognomonic and well known. These ocherous foci actually exist and constitute a step towards the star like figure drawn by Hertel. The first parts of the star are placed within the pupillary area and extend later in rays from the center to the equator.

We have not found a corneal cicatrix. It is probable that the penetration of a splinter of iron was effected obliquely thru the limbus at the periphery of the iris, toward the equator of the crystalline lens in which it is fixed. We know that a small wound of the limbus is no longer visible after 24 hours. The point of penetration in the periphery of the iris is such as to escape attention after the accident; and was promptly concealed. In view of the integrity of retinal projection the intracrystalline seat of the metallic fragment is probable. One cannot, however, absolutely exclude a paracrystalline situation.

It is well known that after a long delay the crystalline lens containing a foreign body becomes completely clouded; the localized opacity slowly progressive for months or years. This is the case with a small metallic body superficially situated in the periphery of the crystalline under the capsule (Wagenmann), an important point in the estimation of damages in cases of insurance.

In this case the crystalline was swollen for months after the wound causing a hyperemia and temporary increase of tension which no longer continues.

The ring of russet spots is not produced as in the case of exogenous deposit, where in many observations they correspond to the margin of the pupil. These spots extend also toward the equatorial zone.

Sattler claims that with a sufficient absorption of oxygen the iron is transformed directly into an oxid, and von Hippel that it is spread by diffusion in a soluble form (oxydized carbonat and albuminat of iron). In the presence of certain organic substances, such as the globulin of the crystalline, it is not precipitated. A ferric combination arises, soluble and apt to be diffused. A portion of the oxid of iron so diffused contracts relations with insoluble albuminoid substances, causes a kind of tannin which explains the cohesion of exogenous cataracts and the necessity for making a large corneal section for their extraction. This opinion of Sattler has been combatted by Elschnig. A ring of brown discrete pigmentation has been seen on the intact posterior capsule which is not covered with epithelium (Hertel).

The same wreath or ring can be produced without wound of the crystalline; the magnetic foreign bodies found in the neighborhood of the crystalline or in the posterior segment of the eye, the crystalline remaining transparent or not (Wagenmann).

Vossius admits that when there exist single rust spots only on the crystalline without lesion of the iris the foreign body is situated in the lens. When there exists simultaneously siderosis of the crystalline and of the iris the situation of the foreign body is in the vitreous or retina. The case of Westphal studied by Landmann closely resembles ours: Wound by fragment of iron February, 1879, lodged in the crystalline or its immediate vicinity; progressive disturbance of vision and inflammation in July, which receded without synechiae. The

crystalline became opaque and a wreath of rust spots appeared in the periphery of the cortex under the capsule. After discission in October, 1880, a small fragment became visible (1 mm. x ¼ mm. x ⅓ mm.) lodged behind the posterior capsule.

Eisenberg studied fourteen cases of ocular siderosis with the seat of the fragment almost exclusively in the vitreous. The crystalline became clouded early by reason of the injury in five cases, and late in 8 cases by the action of the iron; and in the greater part with points of brown under the capsule. The distribution of the rust following figures which eventually became stellate suggests these reflections.

Samelsohn, who studied in 1881 the channels of the lymph of the crystalline, found the brown color appeared always at the equator (?) the regular disposition of the spots of that color suggests a true interstitial circulation in the crystalline lens. The rust has a tendency to slip under the anterior capsule toward the periphery of the organ, under the form of scattered particles which reunite in a first central ring. These extend as rays and in concentric progress towards the equator until the fine particles unite in an external ring, at the position where they seem to be retained. A moving liquid carries the granules of iron to the place under the capsule which corresponds to the greater circle of the iris, at the termination of the zonular fibres of the anterior capsule; the hypothetic moving liquid is directed toward the point of attachment of the zonular fibres to leave the lens and penetrate into the anterior chamber. The fine particles of rust then accumulate at the mouths of the pores thru which only the fluid is able to pass. But for splinters of iron in the vitreous the same accumulations of rust are observed under the anterior capsule. There particles have therefore passed into the crystalline. They not only form heaps of true granules but the granules are contained in proliferated cells of the capsular epithelium. (Leber.)

According to Leber there are neither currents nor pores in the capsule of the crystalline. The transfer which we have in mind is made by diffusion of the solution of iron that can pass thru the intact epithelium, so that the rust points can be grouped in parts removed from the foreign body. Part of the fragment of iron is dissolved by the carbonic acid of the ocular fluids and combines with the diffusible oxid of iron. This combination distributed in the eye is then transformed by oxygen absorbed in the ocular fluids into an insoluble combination, which may be deposited far from the fragment. As von Hippel has established, an important role is here played by the cells and certain tissue elements in which the iron, probably dissolved under the form of an albuminat, is kept in order to pass to the insoluble combination which accumulates in abundant quantity. The reason for the disposition of the spots in the foci of rust at the circle of the pupillary margin beneath the capsule has not been elucidated.

We dwell a moment on the negative results of the means employed to demonstrate in the eye metallic fragments. Why are they still ineffective? If one admits with us the penetration of the corneal limbus by a very small fragment of iron, that it traverses obliquely the iris near its periphery and is arrested in the crystalline (the probable thing) or in the immediate vicinity behind it, the reasons for the negative results of examinations for its detection are readily perceived.

In March, 1920, a radiographic examination was negative (Dr. Murdoch); repeated later it was still negative (Dr. Hauchamps).

The giant electric magnet of Haab applied by us has given no result in July 1920.

The galvanometric examination practiced by Prof. Gallemaerts was equally negative.

As to the radiographic examination we know that the X-rays too often give no skiagram for magnetic foreign bodies of small size.

The attraction of the giant magnet could not be effective on a very small particle fixed between the more or less adherent fibres of a maturing cataract.

The galvanometer could not function we are led to believe because at the time it was applied for the examination, the magnetic foreign body had been entirely transformed into a salt of iron, for we have observed the exquisite sensibility of that instrument in numerous cases of fragments within the eye, which weighed less than 1 milligram. This last hypothesis will equally explain the negative results of the other examinations.

Conclusions. A small metallic particle is fixed in the crystalline lens or in the vitreous in close proximity. The cataract may be extracted or allowed to remain in place. Binocular vision is lost and the indemnity should be estimated at 30 per cent.

Eyes of this kind are exposed to late complications; luxation and subluxation of the crystalline, sympathetic irritation, iridocyclitis, glaucoma, etc.

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THE ETIOLOGY OF CHRONIC MEIBOMITIS.

SANFORD R. GIFFORD, M. D.

OMAHA, NEBRASKA.

This paper reports the bacteriologic examination of material obtained from 65 patients. The studies were made in the Departments of Ophthalmology and Bacteriology, University of Nebraska, College of Medicine. The mechanical factors tending to cause an influence to meibomitis are also pointed out, and the literature of the bacteriology of the Meibomian glands is reviewed.

In a previous communication it was found that the chronic affections of the meibomian glands could be conveniently divided into six classes:

1. Simple hypersecretion.
2. Simple chronic meibomitis.
3. Chronic meibomitis with hypertrophy.
4. Chronic meibomitis with chalazia.
5. Chronic meibomitis secondary to various forms of chronic conjunctivitis, especially trachoma.
6. Chronic meibomitis with concretions.

Before considering any specific bacterial origin, other simpler factors must be taken into account. It was noted that most of the cases in classes 1, 2, 3 and 6 occurred chiefly in patients over forty years of age, while those in class 4 were chiefly in young adults. While the number of cases is small, it would seem that the age factor is important in determining the type of condition. One naturally thinks of the increase of connective tissue in old age, and the situation of these glands, each in its nest of interwoven connective tissue bands, makes them especially liable to compression during these sclerotic changes. Some alveoli are likely to be isolated entirely, and it is probably these alveoli in whose inspissated secretion the lime salts are deposited which form the calculi described under class six. Other alveoli are in places simply compressed, their normal emptying is interfered with, and conditions are created most favorable to bacterial growth. The chronic spasm of the orbicularis in presbyopes, with its abnormally severe milking action on the glands, is doubtless another factor. This alone may suffice to produce the conditions described under Class 1, simple hypersecretion.

The other classes, where signs of inflammation are present, are harder to explain as being due to these mechanical factors alone. Hence it seemed worth while to study the bacterial content of the glands both in these conditions and in normal lids. It is difficult to secure material from the glands free from the flora of the sac and lashes. The procedure adopted was to wipe each lid border with a slightly moist sterile sponge, squeeze both lids together and rub the loop along the mouths of the glands, being careful not to touch the cilia. Moist Loeffler's blood serum or cooked meat broth were usually used as media, both of which proved favorable to the growth of the pneumococcus, streptococcus, Morax-Axenfeld bacillus, and bacillus xerosis. Blood agar was used for a few cultures but was not so satisfactory.

It will be seen that in the twenty cases included in Tables I and II, bacillus xerosis was found in smear or culture nine times, a staphylococcus fifteen times. In the five cases of Tables III. B. xerosis was found twice, a staphylococcus four times. These results are somewhat misleading, however, since in considering material obtained from such a region it must be remembered that some of the growth in cultures originates almost certainly in the roots of the lashes, where staphylococci are known to be almost always present. Organisms found in the smears must be considered as more important than those found in the cultures only. And in most of the smears where organisms were found, bacillus xerosis was present in much larger numbers than staphylococci, and was more often the only organism seen.

Of other organisms, in Tables I, leptothrix was found twice (culture in only one), pneumococcus once and bacilli

TABLE I.—SIMPLE MEIBOMITIS

CASE	AGE	SMEAR	CULTURES
1. Mr. S.	42	Staph., Diphtheroid	B. xerosis, S. aureus, S. albus
2. Mr. M.	32	Not recorded	S. albus
3. Mr. F.	60	Leptothrix, Staph.	S. albus, B. xerosis
4. Mr. H.	27	Diphtheroid, Leptothrix (?) Staph.	B. xerosis, Leptothrix, S. albus
5. Mr. W.	67	Negative	S. albus
6. Mr. N.	?	Staph.	S. albus
7. Mr. C.	47	Diphtheroid, Staph.	B. xerosis, S. albus
8. Mr. J.	56	Negative	Staphylococcus
9. Mr. K.	49	Staph. Gramnegative diplobacillus	S. albus, Gramnegative bacillus like Morax–Axenfeld bacillus
10. Mrs. F.	63	Gramnegative bacillus, Staph.	Staph.
11. Mr. A.	61	Diphtheroid, few Staph.	B. xerosis, S. aureus
12. Mrs. M.	62	Numerous diphtheroids	Not recorded
13. Mr. B.	33	Negative	Staph., B. xerosis, Pneumococcus (?)
14. Mr. F	47	Negative	S. albus
15. Mrs. S.	64	Not recorded	B. xerosis
16. Mr. G.	26	Staph.	S. albus
17. Mrs. B.	54	Negative	Negative

TABLE II.—MEIBOMITIS WITH HYPERTROPHY

CASE	AGE	SMEAR	CULTURES
1. Mr. C.	40	Staph.	S. aureus, S. albus.
2. Mr. H.	32	Diphtheroid, Staph.	B. xerosis, S. albus.
3. Mrs. C.	47	Negative	S. aureus

TABLE III.—MEIBOMITIS WITH CHALAZIA

CASE	AGE	SMEAR	CULTURES
1. Baby A	8 mos.	Negative	Fusiform bacillus
2. Mr. A.	35	Negative	Staph.
3. Mr. G.	28	Negative	Staph., Pneumococcus
4. Mr. R.	54	Diphtheroid	B. xerosis, S. albus
5. Miss T.	22	Diphtheroid, Staph.	S. albus, S. citreus

TABLE IV.—NORMAL LIDS—MEDICAL STUDENTS

CASE	AGE	SMEAR	CULTURES
1.	22	Diphtheroid, few Staph.	S. albus
2.	20	Negative	Staph.
3.*	21	Diphtheroid	S. aureus, Bacillus A. 1.
4.	23	Negative	Bacillus A 1.
5.	22	Few Diphtheroids, few Grampositive bacilli	S. albus
6.	21	Negative	Bacillus A 2.
7.	21	Few Staph.	S. albus
8.	25	Negative	B. xerosis
9.	20	Negative	S. albus
10.	23	Negative	B. subtilis
11.	22	Negative	Staph.
12.	23	Negative	Staph.
13.	25	Negative	Staph.
14.*	21	Negative	Staph.
15.	21	Few large Gramnegative bacilli	Negative
16.	23	Negative	Staph.
17.	22	Negative	Staph.
18.	29	Negative	Staph., B. subtilis
19.	20	Negative	S. albus
20.	28	Negative	S. albus

*Indicates cases with slight inflammation of lid borders or excess of fluid from glands.

TABLE V.—NORMAL LIDS—OLD MEN AT COUNTY HOSPITAL

CASE	AGE	SMEAR	CULTURES
1.	52	Negative	S. albus, B. xerosis
2.	46	Negative	S. albus, B. xerosis
3.	68	Large Grampositive spore bearing bacillus	S. albus, B. xerosis
4.*	64	Large Grampositive spore bearing bacillus	B. xerosis
5.	81	Negative	S. albus, Bacillus A 1.
6.	72	Negative	S. albus, B. xerosis
7.	65	Diphtheroid	B. xerosis, S. albus
8.	56	Negative	S. albus, B. xerosis
9.	58	Negative	S. albus, Bacillus A 1.
10.	70	Few diphtheroids	S. albus, Gramnegative bacillus like Morax–Axenfeld bacillus
11.*	58	Negative	S. citreus, Bacillus A 3.
12.	52	Negative	Staph.
13.	63	Negative	Staph., B. xerosis
14.	87	Negative	S. albus
15.	80	Staph.	S. albus, B. xerosis
16.	63	Negative	S. albus, B. xerosis
17.	58	Negative	S. albus, B. xerosis
18.	76	Negative	S. citreus, B. xerosis
19.	76	Negative	S. albus, B. xerosis
20.*	59	Few diphtheroids	B. xerosis

*Indicates Tables IV and V, cases with slight inflammation of lid borders or excess of fluid from glands.

morphologically identical with the Morax-Axenfeld bacillus were found twice. In Table III, pneumococcus was found once and a fusiform bacillus once.

In the normal lids of the younger age group included in Table IV, B. xerosis was found three times, a staphylococcus fifteen times, while in the older men, (Table V) B. xerosis was found fourteen times and staphylococcus seventeen times. Here cultures must be our chief guide, since few organisms were found in smears. As occasional inhabitants of the glands, it is worth mentioning a group of short, plump, grampositive, motile, sporebearing bacilli which I have not seen described. All were very similar in morphology, being typically short, often almost round, and frequently seen in pairs, but forms swollen at one end and longer forms were not uncommon, while many central spores were seen in older cultures. The typical growth on agar was delicate and transparent with small round colonies. Organisms growing so were found twice in each age group and may be called bacillus A 1. One organism, similar morphologically, but showing a much thicker white growth, is called A 2 and was isolated once; while another organism isolated once was of much more delicate growth, never becoming perceptibly raised from the surface of the slant, and was less plump in morphology. It is called A 3, tho it may prove to be a type more distinct than A 1 and A 2. In cases of meibomitis, I have never found any organisms of this group, but in one case of severe membranous conjunctivitis, a typical A 1 organism was found with others, in smears and cultures from the membrane.

Besides these organisms, a large grampositive spore bearing bacillus, sometimes forming short chains, was found in smears of two cases in Table V. It resembled a hay bacillus, but since it did not grow in aerobic cultures, is possibly an anaerobe. Occasional similar organisms have been found in smears of a few cases of simple hypersecretion, and the "few large gramnegative bacilli" found in case 15, Table IV, were possibly old forms of the same organism.

Bacilli showing the typical clubbed and barred structure after two to three days in culture were called bacillus xerosis. A few strains injected subcutaneously into guinea-pigs produced

only slight local inflammation lasting one to two days, probably a foreign proteid reaction. Fermentation tests were done on only a few strains and these bore out the conviction that I have received from the fermentations of conjunctival strains, that there are several types of diphtheroids to be found in the sac and glands. For convenience, however, the term bacillus xerosis has been retained.

LITERATURE

In my previous communication, several reported cases of severe meibomitis were mentioned in which unusual organisms were found; bacillus mucosus capsulatus and streptothrix.

Reports on the bacteriology of the more usual types, and of the normal Meibomian secretion, however, are very scanty. Kuschbert and Neisser[1] in 1882, in twenty-five cases of associated hemeralopia and xerosis conjunctivae, found masses of slender bacilli in the foamy fatty debris of the sac and considered this organism the cause of the disease. Cultures and animal inoculations were negative.

Reymond and Colomiatti[2] rightly interpreted this foamy material as accumulations of fatty debris from the meibomian glands, mixed with conjunctival epithelium. They confirmed the presence of similar bacilli in large quantities, but stated that they could also be found almost constantly in normal meibomian secretion. They were also unable to grow them on media or in laboratory animals; but from their description, both of these groups of authors would seem to have been dealing with one of the diphtheroids, like B. xerosis. They state that Cervera had found oidium albicans in these epithelial plaques, and they found this organism also, tho not constantly.

Since Deyl (Quoted in Hála) in 1893 heralded an organism found in chalazia, as the chalazion bacillus, Hála[3] and others have confirmed its presence, and grown it in culture. It is interesting that Hála found the bacilli in twelve cases of acute chalazia (?) less than two weeks old. (In such acute and subacute meibomian nodules, I have only once found what was apparently B. xerosis; usually only Staph. aureus.) A discussion of the etiology of chalazia will not be undertaken here, except to state that most observers believe Deyl and Hála's bacillus to be identical with B. xerosis and hence of doubtful etiologic significance.

The nodules produced by Deyl by subconjunctival injection of his cultures hardly seem to have been true chalazia. The introduction of organisms into the lumen of the glands by such a method could only occur by rare chance. I have tried to introduce them into the mouths of the ducts by a capillary glass pipette, but without notable success. A few subconjunctival injections of bacillus xerosis have not in my hands produced lesions comparable to chalazia.

H. Gifford[4], in an article on ocular asepsis, stated that the perfectly normal meibomian secretion had proved sterile in seven out of eight cases, using serum as a medium; but that when waxy casts were expressed, these contained numerous organisms. Aside from this, the observations of Reymond and Colomiatta in smears, above quoted, are the only ones I can find dealing with the bacteriology of normal meibomian secretion obtained by expression. There have been a fair number of reports on the flora of the normal lid borders: Panas[5], Cuénod[6], Harman[7], Fava[8], Betti[9] and others. Of these, Panas, Cuénod, Harman and Betti cultured the smooth lid border separately from the lashes, but some of their material undoubtedly had its origin among the lashes, while Fava cultured the lashes only. As would be expected, Panas and Cuénod who used only gelatin, gelose and agar, obtained chiefly staphylococcus albus, less frequently staphylococcus aureus, Cuénod having found B. xerosis only once. The others, using serum containing media, found a much greater variety. While Harman found chiefly staphylococcus albus and aureus, one normal case showed numerous colonies of Morax bacilli.

Betti found bacillus xerosis, usually in mixed culture, in 85.4% of cases, pneumococcus in 27%, Morax B. in 7.2%, and bacillus influenzae in 4.1%. Fava, culturing the cilia, did not find B. xerosis, but staphylococcus albus was

present in most cases. It is interesting to note, however, that he found four anaerobes, two of which were B. Welchii, and two B. ramosus, also eight strains of B. subtilis, and one nonpathogenic streptococcus. The small diplobacillus found in one case by Cuénod but not isolated, is interesting because of its apparent resemblance to the bacillus A group described in the present work. None of these observers found B. mucosus capsulatus on the normal lid border. Von Michel[10] states that staphylococcus aureus is usually found in meibomitis, but is apparently including the acute with the chronic forms.

COMMENT

Discussion: A discussion of the pathogenicity of B. xerosis, about which so many pros and cons have been written, would hardly be in place here. Its almost universal occurrence in the sac is now well known, as is the fact that it thrives in the presence of pus from any cause. I like to call Bacillus xerosis a "pyophilic" organism to distinguish it from the pyogenic organisms which actually cause pus. Thus we may find it more common in the glands of old people whose secretion is in some way disordered, the cause of its frequency being the same as that of the frequency of meibomitis in old people. It seems worth recording, however, that it is found in larger numbers in the smears of chronic meibomitis, which occurs more often in the old, and is found much more frequently in the normal meibomian secretion of old people than in that of younger people.

Thus it seems credible that, as old age advances, and more and more xerosis bacilli find their way into the glands where their growth is favored by the senile changes previously mentioned, collections of them may act simply as foreign bodies, to produce hypersecretion and inflammation, or simple meibomitis. Where one or more ducts become occluded, chalazia might develop, as foreign body granulomata do elsewhere. A similar accumulation of staphylococci might produce similar conditions. From the younger age incidence of *conjunctivite á chalazion*, however, and the greater frequency of staphylococci in it, at least in my experience, the assumption might be warranted that the staphylococci produce a sharper reaction which is apt to lead to direct occlusion and chalazia; while bacillus xerosis, more frequently present in the glands in old age, produces a more sluggish reaction and so is more apt to produce simple meibomitis. The most feasible way to test this supposition would be to inject the organism by canula into the glands and then occlude their mouths by cautery. I hope to do this some day on larger animals than were available at this time.

I wish to thank Mr. Paul Conrad and Miss Mildred Braden for their help in the laboratory work.

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SOME NEW TESTS FOR ASTIGMATISM.

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These are practical subjective tests. Their convenience and delicacy, proven by use, recommend them.

1. THE "V" TEST FOR ASTIGMATISM.

For this test the capital letter "V" is made to perambulate around the periphery of Snellen's small fan of lines, either with the hand, or better, with a string from a distance. See Fig. 1.

The "V" acts, firstly, as an *indicator*, and secondly, as a *confirmer*. As an indicator, it enables the surgeon to make sure as to which ray of the fan the patient sees best, without the necessity of large figures, which lessen the simplicity of the chart to the patient's eye. Having found the ray, the "V" is next used as a confirmer, to test the correctness of the patient's choice, for if the correct ray has been chosen, the two arms of the "V" will appear of an equally vivid blackness.

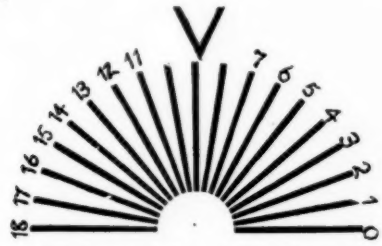

Fig. 1.—Maddox "V" Test for Astigmatism. The "V" can be moved on a semicircle until it indicates the blackest of the radiating lines; and its two arms may be compared with each other, as an additional test.

The "V" should now be moved a little to one side, until a difference appears in the blackness of the two arms, and then to the other side in the same way. In each case the blackest arm will look towards the spot for the correct angle.

If, on the other hand, before moving the "V" from the chosen ray, one arm looks blacker than the other, the patient's selection of the ray was evidently not perfect.

The "V" should always be *moved in the direction of its blackest arm* until agreement in the blackness of the two is arrived at. It will now be found to stand opposite the correct spoke of the fan.

As in all tests of this kind, the patient's head should be held perfectly upright, and he should be made myopic for one of his two principal meridians; and emmetropic, or only faintly myopic, for the other. In other words, the case should be rendered by lenses one of simple myopic astigmatism.

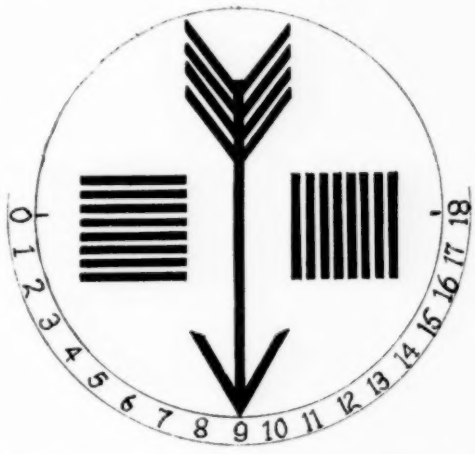

Fig. 2.—Maddox "Arrow" Test for astigmatism. The arrow is turned until its two feathers appear equally "clean," then minus cylinders are used to make the lines at right angles to the arrow as black as those parallel with it.

In most cases I find the "V" Test to be of surprising delicacy, tho with slow-minded patients repetition is sometimes necessary until they have learned how to compare different depths of black in the two arms of the "V."

One advantage of Snellen's fan is that it detects cases of irregular astigmatism. If one line be black, for example, its two neighbors faint, and the 3rd or 4th black again, the case is proved to be one for which all lines and stripes are unsuitable, and the "V" Test should not be employed. For such cases Test Types only are permissible.

2. The Arrow Test.

This consists of a broad arrow bisecting a large cardboard disc, rotatable about its center, and with a square of stripes on each side of the arrow. A fixed graduated semicircle below, completes the apparatus. (See Fig. 2.)

On turning the tail of the arrow in the direction of the "cleanest" feather till the two feathers appear equally clean, the arrow head points to the required axis. As a confirmation, the two edges of the arrow head should then also appear equally matched, and the shaft of the arrow show its best definition. The axis being thus determined, to find the amount of astigmatism it only remains to direct attention to the squares, and insert minus cylinders in the trial frame till one is reached which equalizes the clearness of the two sets of stripes. A small minus sign on the edge of the cardboard disc, 90 degrees from the arrowhead, indicates the axis of this required minus cylinder. It is, of course, taken for granted that the eye is made faintly myopic for the whole chart to begin with, and before inserting cylinders the correct spherical correction should be made for the best square.

If desired, the "V" test and the Arrow test can be joined together with three cogwheels, when a single string and weight can operate the whole set from a distance.

3. Infant's Test.

For very young children to whom the idea of an arrow is not familiar, and who confuse the left hand with the right, I use two squares called "pocket-handkerchiefs," one above the other, so as to require no "right" or "left," and two striped circles called "balls," also one above another.

A child is quick to see which is the "cleanest handkerchief," and the "prettiest ball," and thinks it rather a nice game.

It is needless to say that retinoscopy has to be trusted to chiefly in small children, but a subjective confirmation has its value also.

DISCIFORM KERATITIS SECONDARY TO SMALLPOX.

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In the case here reported a slight injury to the cornea occurred about the time the patient contracted smallpox. The eye became inflamed shortly before the eruption appeared, and subsequently ran a chronic course assuming the form indicated. With comments on the case are given abstracts of similar cases and a review of the literature. Read before the Ophthalmological Section of the Baltimore City Medical Society, December, 1920.

Case—Miss E was referred to me Feb. 23, 1920 by her physician, who had taken a foreign body off of the lower outer quadrant of the cornea on the 13th. The patient said that she had become so comfortable, after the foreign body had been removed, that she had returned to work, and that later it had become perfectly comfortable, but on the 17th her eye began to get red, and on the 19th became painful.

Feb. 23. A number of white vesicle-like formations are seen on the margin of the upper lid of the left eye. Cutaneous surface of the lid not inflamed. Bulbar conjunctiva shows about a half dozen red elevations in the region of the insertion of the internal rectus. The elevations are about the size of the lead in an ordinary pencil, are grouped closely together, are quite red, and do not contain fluid. Each single elevation looks very much like a phlyctenule. Other portions of the conjunctiva are injected, but there are no elevations. Cornea clear, and no mark from foreign body. Pupil active. Eye painful, photophobia and lacrimation marked.

There are a number of hard, painless, nonvesicular elevations on the forehead, face, nose, lips, and hands. Right eye normal. (Later learned that while the patient had continued with her work she had complained of feeling badly generally, but there was no particular reference to the eye until noted.)

Feb. 24th. More comfortable, eye a little less red. A very small central area of the cornea stains with fluorescein. Stained area not seen without the loupe. No change in spots on the lids, face, or hands. (Diagnosis of impetigo contagiosa and chicken-pox considered.)

Feb. 25th. More comfortable. No changes in the conjunctival elevations; cornea clear. Referred her to a dermatologist, who made a diagnosis of smallpox. The Health Department confirmed the diagnosis, and the patient was sent to quarantine.

March 16th. Released from quarantine on the 13th. No marks on face, or hands; margins of lids normal: conjunctiva still slightly congested, altho elevations have entirely disappeared. In the center of the cornea there is a round uniformly gray opacity that is a little larger than the pupil; the opacity is not deeply situated, but apparently is in the substantia propria, and is definitely outlined. Epithelium over the cloudy area is intact; pupil active; eye not painful; some lacrimation, and photophobia, but not so marked as at the first examination.

March 20th. Lacrimation and photophobia more marked; eye very uncomfortable; pupil active. Ordered atropin 1% t.i.d Dark glasses.

March 24th. Pupil well dilated; little change in lacrimation and photophobia; conjunctiva not markedly congested. Opacity appears to be no larger, but has extended deeper in the cornea. Patient still very uncomfortable.

March 30th. Pupil not well dilated. Atropin 2%, one drop every 3 hrs.

April 2nd. Pupil well dilated. Patient says vision is better. Central opacity is still rather sharply defined, and appears to be superficial. There is a second deeper and concentric zone of grayish opacity that is not so dense, is circular, and involves about two-thirds of the cornea. The central portion of the opacity is about three mm. in diameter, the total opacity being about seven mm. Cornea does not take stain. Wasserman negative. Hot applications and dionin.

April 9th. Patient more comfortable.

Hot applications have given much comfort. Central portion of the opacity becoming more dense; the more diffuse, deeper, outer zone has not increased in extent. Pupil not dilated. Patient reports using atropin regularly. Atropin 5% t.i.d.

April 14th. Pupil dilated, opacity becoming more sharply circumscribed. Still complains of much pain.

April 15th. Reports eye comfortable yesterday, uncomfortable last night, comfortable today. Continue hot applications and atropin.

April 17th. In the cornea between the superficial and the deeper portion of the opacity there is a clear area that suggests a separation of the tissue. It appears as tho there were a drop of clear fluid lying between the lamellae. Patient continues comfortable.

April 20th. The deeper portion of the opacity is clearing, and decreasing in size. Vesicle like formation in the cornea is unchanged. No definite wall to vesicle, contents clear.

April 26th. Patient comfortable. Vesicle decreased in size, contents clear.

April 30th. Patient continues comfortable. Vesicle practically absorbed without leaving any trace. Peripheral opacity decreasing in extent, and density.

May 10th. Cornea clearer, central opacity more dense than peripheral portion, there being a definite difference in the density of the two areas. Photophobia and lacrimation much less. Injection of the conjunctiva has passed off.

May 15th. Cornea clearer, central opacity a little smaller, outer zone smaller and fainter. Boundary line between central, and peripheral portion of opacity is pronounced; there is not a gradual transition from inner to outer zone.

May 24th. Cornea clearer, central opacity rather dense; is about the size of the pupil. Outer zone is gradually fading out.

May 28th. Central portion unchanged, peripheral portion fainter. Discontinue atropin. Dionin 1%, one drop at bed time.

June 3rd. Pupil about normal size; central opacity less dense; peripheral opacity shows only a faint halo. Vision 20/200.

June 6th. Vision 20/120. No change in central opacity; no photophobia, lacrimation, or redness of the conjunctiva. Continue dionin. Return to work tomorrow.

June 24th. Pupil normal size, and active. A central round opacity covers the entire pupillary area; margin of opacity quite definite. Halo has disappeared. Vision 20/200. Continue donin.

Nov. 16th. Opacity somewhat smaller than at last examination. Is 3½ mm. in diameter, and somewhat irregularly circular; not sharply outlined, the outer margins gradually fading into the clear cornea. In the lower, inner quadrant there are numerous tiny yellowish-white pin point like spots, which are so numerous as to lie in contact with one another. By oblique illumination it is difficult to determine the position as to the depth of the opacity. Apparently the yellowish-white spots are more superficial than the general gray opacity. All irritation has passed off. Vision 20/120.

COMMENT WITH REVIEW OF LITERATURE

The case just reported presents a number of interesting aspects. The variety of keratitis is certainly a rare one. The relation which it bore to the foreign body, and to the variola, is a question that becomes all the more important because the patient was one whose case was brought before the State Accident Commission for decision as to compensation insurance.

Concerning the diagnosis, the appearance quite agrees with the description of disciform keratitis.

Disciform keratitis was first fully described by Fuchs[1] in 1901, altho, according to Weeks[2], it had been described by v. Arlt of Vienna as early as 1870, under the name of abscessus siccus corneae. Vossius described it in 1885, but mentioned it as an abortive interstitial keratitis.

Fuchs[3] under the heading Keratitis Disciformis says, "This is a keratitis that is allied to ulcus serpens, and consists in the development in the middle layers of the cornea of a gray disc shaped opacity.

In the center of the disc a small more deeply clouded speck is commonly observed. The periphery of the disc is sharply delimited by a border of deeper gray which in many cases is made up of concentric lines. This disc-shaped infiltrate never becomes yellow, nor leads to disintegration of the cornea. Only exceptionally a small loss of substance develops over a certain circumscribed area. The irritation symptoms are mostly not pronounced and hypopyon is absent or scanty. The course is protracted, as it takes one or more months for the eye to become free from congestion, and for the infiltration to become transformed into an opacity that becomes permanent. The cause of the disease, just as ulcus serpens, is an infection of the cornea from without, the central grayer speck representing the point of entrance of the bacteria. The epithelial lesion that precedes the infection may often be attributed to a slight injury, and in some cases to an antecedent herpes corneae febrilis, but in many cases the cause remains unknown."

Opportunities for miscroscopic study of disciform keratitis have been infrequent. Such studies have been made by Verhoeff[4], Meller[5], Hadano[6], Wagner[7], and Kuboki[8]. In the report by Verhoeff, as well as in that by Meller and by Hadano, there is apparently some uncertainity as to whether it is a case of disciform keratitis, or keratitis profunda. Verhoeff and Meller examined the whole eye, while Hadano examined a piece of tissue removed from the cornea with a sharp spoon.

Wagner's case was of particular interest, and is related in full: "A man 77 years of age presented a large crescentic marginal ulcer that stained with fluorescin. The largest part of the corneal center looked dull, somewhat fatty, and did not stain with fluorescein. The center is yellowish-white, sharply limited; and the opacity seems to be in the corneal substance, while a much larger grayish opacity, still deeper, surrounds it. Only at the nasal side a connection between the larger marginal ulcer, and the deep central disc exists."

Because of lack of improvement and pain, enucleation was done four days after admission to the hospital.

In summing up his microscopic findings he says: "We see that the necrotic disc is limited forward by a fairly strong infiltrated tissue, with numerous killed lymphocytes; backward, partly by a similar infiltration tissue, partly by the membrane of Descemet, partly by an agglomeration of polynuclear leucocytes, and toward the sides by living corneal tissue, which shows a moderate increase of its normal nuclear elements. Descemet's membrane is absent for about the fourth part of the corneal center. For nearly its entire extent, a single layer of lymphocytes is found between it, and the corneal parenchyma. The endothelium is nowhere present in normal condition. It is entirely absent or it is much proliferated. Spots are found where the endothelial cells are irregularly dispersed on the membrane; polynuclear leucocytes and some lymphocytes lie between these.

In other places the endothelial cells are entirely free from the membrane and sometimes at a little distance away; they then have proliferated in the fibrinous hypopyon, strongly infiltrated with polynuclear leucocytes, which cover the posterior wall of the cornea. They show a strong inclination to proliferation, which goes sometimes so far that true giant cells are present."

Wagner concludes "that disciform keratitis is characterized by a disc like part of strongly altered corneal tissue, lying deep; caused by toxins, produced by microorganisms existing in the epithelium. These toxins have not yet been discovered, but their presence we can surmise with great probability."

In Kuboki's case the disease was in the inner and lower quadrant, and showed in the center two concentric, ring like opacities. Histologic examination of a freshly cut portion showed that the opacity was due to cell infiltration, which occurred in the outer and middle layers of the parenchyma. Bowman's membrane was partially defective. The epithelial cells of the inner basal layers were irregular. The more lightly affected portions between the rings

showed cell infiltration due to edema, necrosis, and fatty degeneration.

Altho some of the features of disciform keratitis, as described by Fuchs, are lacking in this case it seems to me there can be no doubt of the diagnosis. There are but two points of dissimilarity, the first being the absence of the clearly defined ring, and the second the vesicle in the deeper structure of the cornea. There are a number of points of confirmation: A definite circular opacity, below Bowman's membrane, equal to the size of the pupil, and an outer zone involving about one-half of the remaining corneal tissue; no loss of epithelium, or breaking down of the deeper tissue: a mild iritis, no hypopyon, a marked photophobia and lacrimation; moderate injection of the conjunctiva, a long convalescence, resulting in a permanent impairment of vision.

In this study of disciform keratitis I have been impressed with the apparent confusion of disciform keratitis, ulcus serpens, and annular keratitis.

In the disciform keratitis there is no loss of epithelium or corneal tissue, except on rare occasions, and then the loss is slight, the opacity is central, circular, and may involve the cornea to any depth; it runs a long course, and results in impaired vision.

The early stage of ulcus serpens produces changes that are similar to changes in advanced disciform keratitis, but in a short time, in the ulcus serpens, there is a breaking down of the corneal tissue, ulcer formation, intense iritis, turbid aqueous hypopyon, and soon perforation of the cornea.

Fuchs[9] describes annular keratitis as a variation of parenchymatous keratitis, and says it is that form which begins with maculae in the central portion of the cornea; and that it not infrequently happens that the maculae at a certain distance from the center are particularly dense, thus forming a very opaque ring which in its subsequent course contracts more and more toward the center of the cornea.

According to Fuchs[10] disciform keratitis is an infection of the cornea from without, the bacteria gaining entrance thru some slight injury to the corneal epithelium, and some cases may be due to an antecedent herpes corneae febrilis, but in very many cases the cause remains unknown.

Verhoeff[11] contends that it is of neuropathic origin, and states that it also may be caused by nongonorrheal ophthalmia neonatorum, due to the streptococcus mycosus.

Weeks[12] thinks that tuberculosis at times may be a cause.

Zani[13] regards it as an infection that gains entrance thru an injured epithelium.

Nishimura[14] reports a case in which the hay bacillus was isolated. But I wish especially to mention that Roemer[15] states that it has *repeatedly developed after vaccine infection* of the *cornea*, and that Schirmer[16] has also observed it from an *infection from vaccine virus*.

In discussing the importance of vaccinola to the eye, Roemer says, "In many cases the cornea becomes involved, especially when a defect is present in the epithelium, and a keratitis develops which resembles, to a certain extent, disciform keratitis. A delicate gray disc is formed, its margins denser than the central portions, which is sometimes surrounded by parallel rings. At the same time symptoms of a serous iritis appear, with deposits on Descemet's membrane. Permanent opacity results."

Schirmer writing on "Keratitis Disciformis and Keratitis Postvacciniolosa," reports: "The mother of a child vaccinated successfully developed an inflammation of the right eye eleven days after vaccination. After fourteen days she was examined. A vaccine pustule was found on the lower lid, the cornea had a paracentral epithelial defect of the size of a lentil, and to the nasal side of this a distinct gray circular line of infiltration of the parenchyma, perhaps even of the posterior surface, and irregular striations. The iris was slightly muddy and swollen. The epithelial defects healed over, but a large central, cloudy plaque, with a larger gray circle around it developed."

He concludes his article stating, "The term keratitis postvacciniolosa should be

abandoned in favor of keratitis disciformis."

Zani[13] reports three cases, one of which follows a vaccine pustule on the lid.

Baker[17] in a paper under the title "Eye Complications of Smallpox," published in 1903 describes the ocular complications observed in 2,746 cases. There were various lid, conjunctival, and corneal complications. Of the corneal complications five were noted as having small ulcers when discharged from the hospital. Two of these five perforated and resulted in phthisis bulbi.

I feel that we are justified in believing that the other three which were diagnosed as small ulcers were cases of disciform keratitis. They evidently developed late in the course of the smallpox, and were not well when the patients were ready to be discharged from the hospital.

Chance[18], in American Medicine, describes eye complications observed in 2,000 cases of smallpox in Cleveland, in 1901 and 1902. He states, "The corneal inflammation may only be a slight, superficial haze confined to the corneal conjunctiva, or Bowman's membrane, or it may extend rapidly, and involve the entire cornea."

Finlay[19] (1897) under the title of Keratitis Variolosa describes 24 cases of an unusual form of keratitis following smallpox that he observed during an epidemic in Havana. He states, "The usual time for the appearance of this complication is between the end of the second and the end of the third week of the disease, after desiccation has commenced; occasionally it occurs earlier, at times not until after convalescence is fully established. At this, its earliest stage, one finds at a point in the cornea, somewhere between its center and the margin, an irregularly square shaped patch, from one to two mm. square (even when involving the center of the cornea its situation is apt to be excentric). The greater part of its area is transparent, tho distinctly differentiated from the remainder of the cornea by oblique illumination with accurate focusing, and gives one the impression of a more or less large drop of fluid contained in the substance of the cornea. The edge nearest the corneal margin, however, stands out prominently, showing a deep milky-white infiltration. The epithelium over all this area is intact. At this stage one also finds moderate ciliary injection, marked photophobia, blepharospasm and lacrimation. * * * Gradually the margin of infiltration extends over the remainder of the patch till the whole presents a uniform milky-white or yellowish color; occasionally, however, the edges show deep infiltration thruout the whole course. Whilst this is going on a partial or total desquamation of the epithelium covering the infiltration area takes place. Ciliary injection is, of course, more marked. * * * Seldom is there an accompanying iritis. Hypopyon at times is present; in none did spontaneous perforation occur. After lasting for a longer or shorter time, the objective symptoms slowly commenced to recede, the infiltration areas gradually becoming vascularized. This vascularization in its turn diminishes, and finally a more or less dense leucoma results."

This description was written, by Finley, about four years before Fuchs' description; and while there are points of dissimilarity, I believe these cases should be classed as disciform keratitis, due to smallpox infection.

Councilman[20] in his experimental work in searching for the organism of smallpox showed that he could inoculate from eye to eye indefinitely without any change in the character of the lesions. He showed that no other injury to the cornea of the rabbit, or no other infection, produced lesions of the same character as those produced by inoculating the cornea with vaccine, or variola virus. He inoculated from the cornea of the rabbit to the calf in the fifteenth and twenty-fifth generation, and in each obtained perfectly typical vaccine pustules. Children were vaccinated from the cornea of the rabbit in the thirty-sixth generation and typical vaccinia resulted.

Schirmer vaccinated with the gray corneal epithelium of one of his patients upon the cornea of rabbits, and guinea pigs, and produced disciform keratitis. Subsequent vaccinations from them to other animals reproduced the disease.

Nishimura isolated the hay bacillus from his case of disciform keratitis. The same form of corneal lesion was reproduced experimentally in the rabbit.

Zani interprets one of his cases as the result of nutritional disturbances of the cornea, consequent upon intense chemosis, thru which the specific organism gained entrance.

It is quite apparent that disciform keratitis that originates from vaccinia or variola is an infection that gains entrance into the cornea thru a defect in the corneal epithelium, and that it comes on late in the course of the smallpox.

In the case under study the foreign body was removed from the cornea four days before the eye became inflamed. Eight days later when the patient was removed to quarantine, the conjunctiva showed elevations that were analogus to those on the lids and face that later developed into pustules. At this time the cornea was clear. It seems reasonable to suppose that had the cornea been infected thru the break in the epithelium caused by the removal of the foreign body, and with the original infection, there would have been corneal changes of the same stage of development as in the conjunctiva, and on the lids and face. Such changes were not present. It is likely that the infection of the cornea did not occur at the time of the primary infection, but that it occurred in the later stage of the disease; possibly thru the break in the corneal epithelium that was present seven days after the conjunctiva began to get red. At this time (of conjunctival inflammation) elevations that resulted in pustules had formed on the lids, forehead, and face, but the cornea showed no sign of involvement. When the cornea did become involved is uncertain. On this point the patient could give no information.

The onset of her smallpox was about the time that she got the foreign body in the eye. After the removal of the foreign body she returned to work, and in a few days began to feel very badly, (the eye in the meantime having become quite comfortable). During that time, the patient states, she had headache, and could hardly continue with her work.

According to Story[21] and also to Chance, smallpox pustules do not form on the cornea. They may form on the conjunctiva near the limbus, when extension into the cornea may follow. Chance further states that corneal complications also may arise during the stage of desiccation, when the contagion is transmitted from the broken down pustules, as, for instance, those of the skin or the eyelid.

Parsons[22] states that the cornea is never involved before the 10th day, and generally it is the 12th to the 14th day.

In the cases reported by Finlay and by Harlan[23] the opacity appeared near the end of the second week, or even as late as the beginning of desquamation.

It is quite likely that the infection in this case occured from the pustules that had formed on the lid, and conjunctiva. On her return from quarantine, which was 28 days after the eye first began to get red, and 20 days after the last observation, the corneal disease was in its early stage. This is shown by the small central opacity, and by the later extension of the opacity, and still later by vesicle formation, and a prolonged convalescence.

In the inoculation experiments the virus was injected into the cornea of healthy guinea-pigs, rabbits, and calves, the animals not having undergone the reaction from vaccination or from smallpox, and the lesion of disciform keratitis was not produced. So too in the corneal lesions that are reported as following accidental vaccine infections, there was not produced the picture of disciform keratitis; but a much more severe reaction, and a much more serious breaking down and loss of corneal tissue. This was seen in Caillaud's[24] case in which there occurred an injury to the cornea in vaccination, and three days later a central ulcer with the deep and slowly healing abscess, leaving a large scar. Almost similar conditions have been observed by Snydacker[25] and by Story[26].

In the type of keratitis under discussion the corneal infection appears to occur after the pustules are formed, sometimes as late as the period of desiccation, the blood in the meantime having had time to react against the toxin, so

that when the second infection occurs, which involves the cornea, the reaction is not so severe.

Because there had been a foreign body on the left cornea near the time of the onset of the smallpox, the patient believed that the loss of vision was due to the foreign body. She made such a claim before the State Industrial Accident Commission. The Commission accepted her opinion, and awarded her compensation for the loss of an eye.

I am of the opinion that the corneal changes that at times occur during the progress of a case of smallpox are the result of a secondary infection, and that the corneal reaction is less severe because of the previous systemic reaction to the same toxin.

The indications are that disciform keratitis secondary to smallpox is a specific inflammation, probably as specific as the pustule itself.

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OCULAR DISTURBANCES IN ENCEPHALITIS LETHARGICA.

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ARNHEM, HOLLAND.

In reporting two cases seen by himself the author compares them with the cases that have already been published in Holland and reviews the accounts given of this disease in other countries. The general symptoms are considered and then the ocular conditions, motor, visual, and pupillary are each taken up in detail.

Among the many epidemics which during the last few years ravaged the old and the new world, many cases of lethargic encephalitis were published. (In Australia and Austria in 1917, in England and France in 1917-1918, in America in 1919). In Holland 15 cases were published in 1919 and 1920, to which I can add two new cases. Tho the diagnosis could not be made from the presence of any constant syndrome of clinical symptoms, to many investigators, the ocular symptoms have proven so helpful in fixing the diagnosis that they were estimated to be the most important; and especially because this disease is characterized not only by the frequency of the well known isolated or combined nervous paralysis, which we meet in other infectious and nervous diseases, but because supranuclear disturbances of the fibres or centres of associated movement, often preceding the other symptoms, were noted.

Nonne assigned an independent place to this illness, in contrast with three other diseases which gave differential diagnostic difficulties: (a) nona in which bulbar symptoms were absent; (b) premature paralysis agitans which proceeds more slowly and without inclination to sleep, (c) bulbar paralysis, in which changes of the ocular muscles and pupillary changes were absent. Moreover there are many other affections with which this encephalitis can be confused, but these can be safely dismissed here. Nonne called this illness epidemic bulbar myelitis and encephalitis of the crura cerebri. He gives account of the following details.

The affected persons, who either shortly before suffered from influenza, or not, or whose associates had suffered from it, or not, and who neither had had tuberculosis, lues, nervous diseases or psychoses, and who did not use alcohol or narcotics to excess rather quickly contracted encephalitis without many general symptoms. This encephalitis progresses more or less gravely, or shows an abortive form, and cannot be recognized to be an inflammation by examination of the cerebrospinal fluid. This has not proved true. There have been found in some cases, high pressure, leucocytosis, poikilocytosis, and the postile reaction of Nonne. In the blood can occur a slight leucocytosis.

Most cases heal entirely, but in a few cases there remain permanent disturbances of the cerebral nerves, and among them the most important is the reflex and absolute fixity of the pupil. Hence the Argyll-Robertson phenomenon can not be considered pathognomic for syphilis. There also often remain athetoid and choreic movements in the limbs, and physical and mental weakness. Death followed in the minority of cases. I found the following figures: in France there was mortality in 33% (Netter), in England 25%, in Austria 45% (bad condition of nutrition?), in America 10% of the clinical cases.

Nonne further draws our attention to the extrapyramidal disturbances of motion. The members of the body take a passive attitude, there is a general rigidity in the muscles, there is mimical stiffness, now and then there are tremors in different muscles and rhythmic contractions of the muscles of mouth and cheek. The reflexes are normal. The vesical function may be insufficient. There may be apathy or changes of disposition. Often there is no fever. Sleepiness is the cardinal symptom. About the paralysis of the cerebral nerves, I will speak in connection with the discussion of the cases published in Holland.

In 1920 Economo has described a new epidemic with toxic, tabetic and poliomyelitic symptoms. Pathologic-anatomic investigations have shown that the symptoms are due to nonpurulent polioencephalitis with hemorrhages and degenerative processes in the great basal ganglia, especially in the thalmus opti-

cus and the midbrain (corpora quadrigemina, aquaeductus sylvii, floor of the 4th ventricle); also now and then small cell infiltration of the leptomeninges and pial septa of the spinal cord, (von Economo, Stern, Oberndorfer, Nonne).

The virus in not known. Grampositive diplostreptococci were found by von Economo, von Wiesner and Stern, and a filterable virus by Loewe and Strauss, (very small cocci). Bacteriologic studies of the blood had no result. Various investigators, as Nonne and Netter, have drawn our attention to the fact that this encephalitis is characterized by the motor apparatus of the eyeball only being disturbed, externally as well as internally. Bollack states there is no impairment of visual acuity or fields, or of the sensibility of the cornea and conjunctiva. The last has not proven true. Nonne describes absence of the corneal reflex and hypesthetic skin and mucous membrane, also affections of the motor part of the fifth nerve. Three Dutch authors, van Wyke, Bosman and Hacke, also mention affections of the fifth nerve, in contrast with Bartels, who did not find them. It is my opinion that the first part of the utterance of Bollack too must be revised, and likewise Bartels' opinion that the negative findings of the pupil are of differential diagnostic importance.

I acquired this conviction because I observed a case with bilateral ring scotoma, which started at the blind spot and was doubtless not functional. In examining the literature, I found that this discovery is new. But it is incorrect to think that other investigators found the optic nerve always healthy. Von Economo and Bartels once found a slight retrobulbar neuritis, and once a beginning optic atrophy. The latter author describes a temporary paracentral scotoma—so this case shows resemblance to mine; and another time contraction of the visual field for green. Oberndorfer saw once in 8 cases a slight optic neuritis; and Hiram Woods and Shumway saw the same, each once in six cases (the patient of Shumway died afterward).

In consulting the Dutch literature it struck me, that just there so many ocular affections were mentioned; in adding my case to the observations of Henkelom, Cramer and Hacke, I find them 10 times in 17 cases. It is true that the described symptoms: V=1/60, slight paleness, slight edematous swelling of the papilla, slight venous hyperemia of the background, are not of such importance that they may give rise to far-reaching conclusions; but undoubtedly they plead more for than against the meaning, that the optic nerve can also be affected in lethargic encephalitis. I think that the somnolence of the patients often prevented the investigators taking good visual fields.

My patient's history is the following:

Case 1. D. W. M. age 23 years, consulted me April 26, 1920 with the following ocular symptoms: anisocoria, the left pupil (5 mm.) is wider than the right, (3 mm.) and shows neither a direct nor a consensual light reaction, nor a narrowing on converging. The right eye only shows a very slight direct and consensual pupillary reaction. The temporal part of the papilla is paler than that of the left eye. The accommodation is paralyzed on both sides and the patient cannot look downward. V. R. 4/18; L. 4/18, Hyperopia 1 D. and 1.25 D. Vision after correction R. 4/12; L. 4/8.

The man had been sick for some days, he had perspired abundantly, had had pains in arms and legs; he gave an impression of somnolence and had mimical stiffness. In the course of the first week it appears that the patient is sleepy and dull, tho he can be talked to. His voice is monotonous and low (bulbar paralysis). He is unable to wrinkle his forehead. He does not vomit and has no headache. He has a tremor of his head and hands, and rise of temperature that remained till his departure after 6 weeks, and fluctuated betwen 37.2 and 38. (in the evening generally between 37.6 and 38). This made the neurologist, Dr. Drossaers, and myself think of a disturbance of the center of heat regulation in the thalamus. Moreover a precise examination of the eyes showed a very slight ptosis and a very slight paresis of the recti externi, with a paresis of the convergence.

On April 29th the direct light reaction of the right eye was also very slight, but the following day was restored somewhat. After May 3d he could again wrinkle his forehead. On May 6th there

was again a consensual and direct light reaction in the left eye; whereas the reaction of convergence which was present on the right side remained indistinct on the left side. Gradually speech improved. He opened his mouth somewhat obliquely (paresis of the right pterygoid). Difficult movement of the oral and nasal muscles, chiefly on the left side. Lying on the floor the patient could raise his eyebrows, standing he could not do so.

The lumbar fluid contained 11 cells per mm. (Fuchs-Rosenthal method.) Later on Dr. Reinders Folmer found 8 per mm. The reactions of Nonne and Wassermann were negative. The sediment contained no tubercle bacilli, and agar and ascites cultures did not germinate. In the first week the patient was too dull to allow his visual fields to be mapped out. After 2 weeks I found a concentric contraction of the periphery on both sides, (Fig. 1, Case 1.) on the left side of a wing shaped enlargement of the blind spot, and on the right side a ring scotoma, taking its origin from the blind spot, which also was enlarged in the horizontal direction. Everywhere it was between 10° and 20° away from the center, and had a breadth from 2° to 5°. After a few days I noticed that also the left eye showed a ring scotoma about the same shape. In order to exclude as well as possible the presence of a functional symptom, I determined these scotomas four times in the course of the following weeks, as well on the perimetric arc as on Bjerrum's screen at different distances, and always found the typical ring scotomas on congruent places. The peripheric contraction diminished a little gradually; the ring scotomas remained. The patient went away with a slight improvement of the accommodation, the pupillary reactions and the downward movement of both eyes.

CASE 2. Y. G. R., aged 42, came January 26, 1920 with complaint of diplopia and the letters growing dim when reading (paresis of accommodation). His visual acuity of each eye with C+0.5, cy.=5/6. He had esophoria and the next day convergent squint. Moreover he was sleepy and dull, had mimical stiffness, slight ptosis on both sides, and unequal pupils, which showed no light reactions. The width of the right pupil was 3 mm. that of the left one 4 mm. On January 28th, he had a divergent squint with a paresis of the convergence, (Fig. 2, Case 2) and a slight insufficiency in moving his eyes downward. In attempting the latter he got vertical nystagmus.

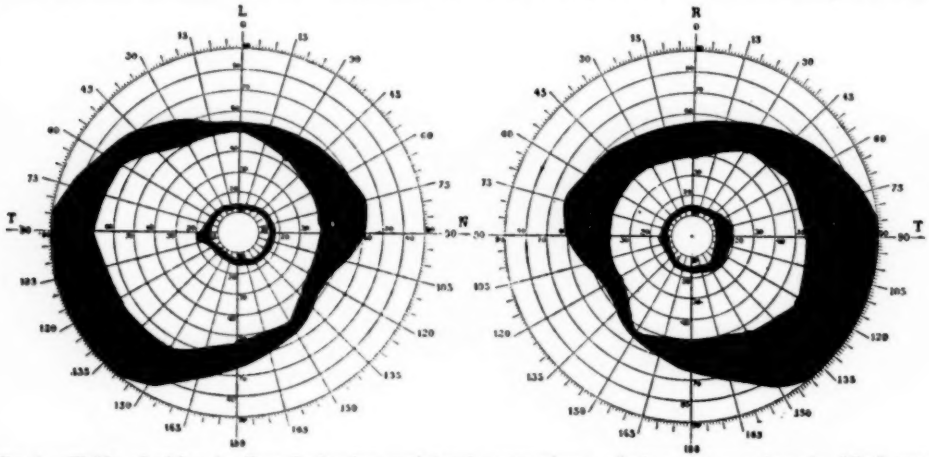

Fig. 1.—Fields of vision in Case I showing peripheral contraction, and ring scotoma thru the blind spot, in each eye.

He remained from February 3 until March 11 in clinical observation. Almost during the whole month of February, he showed a rise of temperature, fluctuating between 36.° and 37.9°, rarely 38.°, in the second half of February it fluctuated between 36.8° and 37.5°. In March the fluctuations had still narrower amplitude. In the first weeks the pulse changed be-

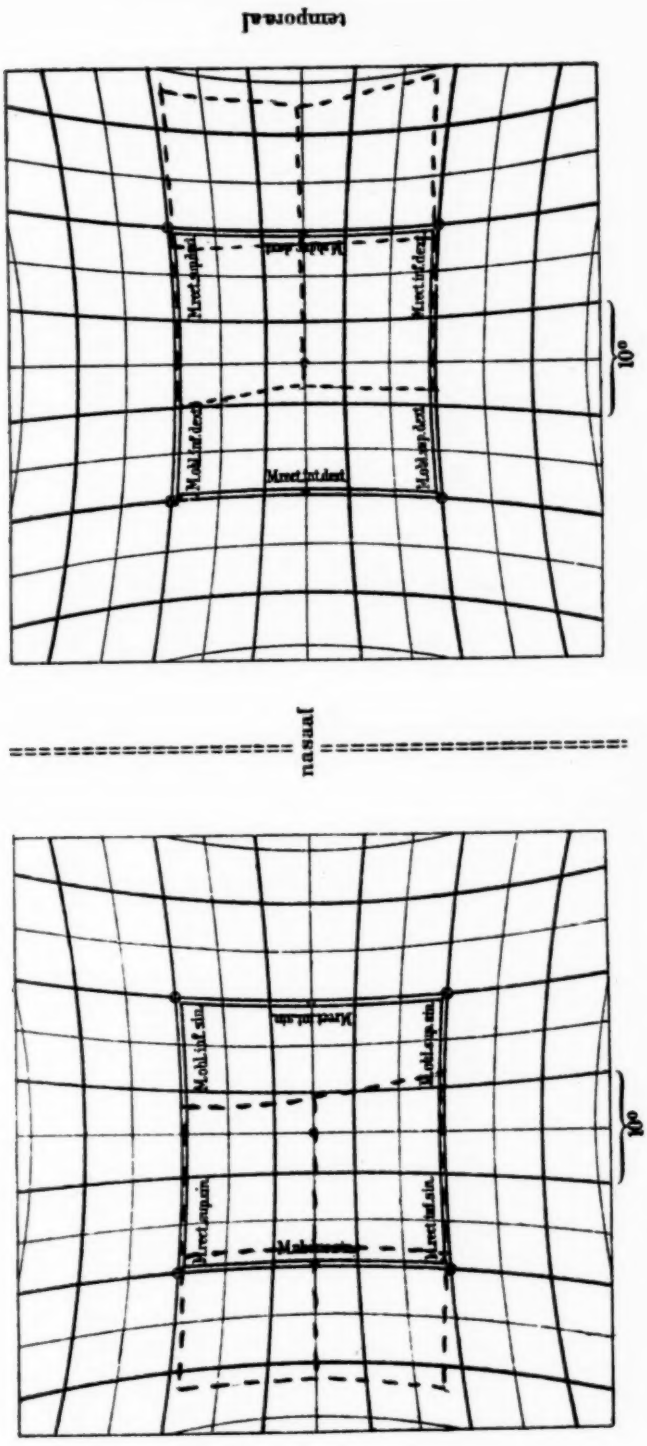

Fig. 2.—Fields of fixation in Case II showing paresis of convergence.

tween 110 and 95, diminished somewhat with the temperature but remained too frequent. Such was also the case with the respiration. From time to time the patient was short of breath and oppressed. He slept very much during the first 10 days, sometimes waking with a start by day. His mind was clear. No difficulty in urinating, no disturbances of the reflexes. Slight general hypertonia of the muscles. In the beginning he lay on his back for hours in an apparently passive attitude. Low monotonous voice, rigid smile, trembling mouth corners. On both sides a light facial paresis. When after 3 weeks the patient again tried to walk, he had to do this very carefully. At the end of January the convergence reaction of both pupils disappeared also, (absolute rigidity). The visual fields were moderately concentrically contracted. (Fig. 3, Case 2.)

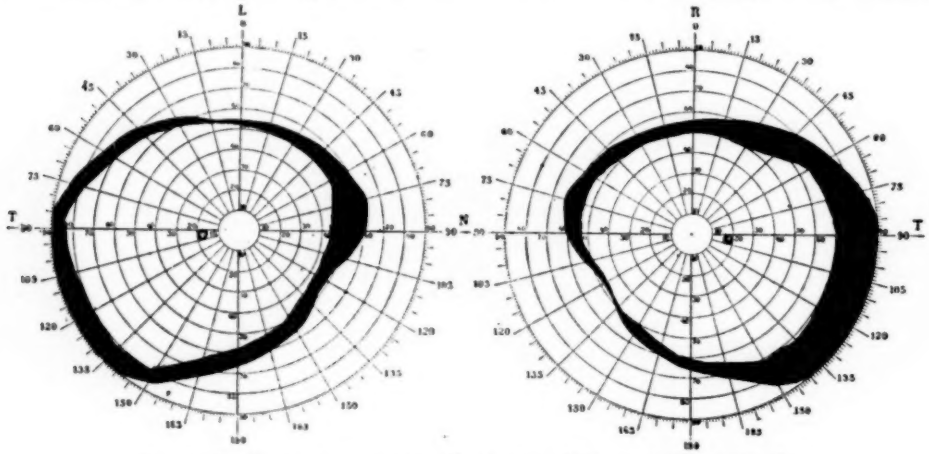

Fig. 3.—Fields of vision in Case II showing slight concentric contraction.

The patient went home with a manifest divergent squint of inconstant amount. He worked again with a ground glass before one eye. The paresis of accommodation disappeared rather quickly. On June 25th, the patient was again sleepy. He had still a divergent squint, but temporarily could bring both eyes to the median line when fixing a near object. Soon after the left eye wandered outward. In looking downward, which he was able to do again, the divergence diminished. In looking upward it increased. The visual fields were normal, only shifted over each other in a horizontal direction. In looking upward vertical tremulations were seen. The left pupil was still somewhat wider than the right one; the direct and consensual light reactions were feebly present, the reaction of convergence was absent. Moderate contraction of the left visual field. Normal blind spots.

December 14, 1920. The best proof of there being a persistent paresis of the convergence was that an advancement of the left rectus internus which I performed in July, 1920, to try to deliver the man from his spectacles of opaque glass and restore his binocular vision, at least for the distance, had only a temporary success. The left eye gradually deviated, so the situation in December was about the same as in June. The left internal rectus showed little nystagmus on looking extremely to the right. The pupillary reaction of convergence was entirely absent. Looking downward was accompanied with slight vertical movements. Fibrillar trembling in the right orbicularis. Accommodation normal. Pupils of equal size. (3 mm.) In February the situation was the same as Dec. 20.

COMMENT.

It is interesting to discuss these two observations in connection with the other Dutch cases published in the Nederlandische Tydschrift voor Geeneskunde in 1919, (Beck, v. Wyke, Liegebeek, v. Henkelom, Bosman and van der Tak) and in 1920 (Cramer, Hacke, Kruisinga). Altogether 15 cases, of which 8 were described by Hacke. It is not easy to give a general review of the Dutch

cases. As the syndrome often is not very characteristic, many cases will not be recognized. It is also very probable that many cases were not published. Wolff says in a report that in 3 weeks he saw 4 cases; Cramer says that in 1918 and in 1919 he has also treated these cases, and that in 1920 he had heard of new ones. I know that in Arnhem the diagnosis has been made by others besides me. The following symptoms have been observed in Holland:

General Symptoms. As a rule the illness began acutely with the well-known general symptoms. In 2 cases only the inclination to sleepiness or dullness was absent (van der Tak; case 2 of Hacke.) Sleeplessness twice preceded the lethargic state, and among the symptoms of irritation, we notice psychic disturbances as anxiety, depression, hallucination, delirium, aggressive attitude, etc. In 3 cases there was no fever. Acceleration of the pulse existed in half of the cases. Frequently the urine contained albumin, and sometimes uroblin. Irregularities in urinating, retention as well as incontinence, were described 8 times. Two persons suffered from excessive perspiration. Where the reaction of Wassermann was done, it was negative.

There were no meningeal symptoms. Stiffness of the neck was not found at all, and only Cramer observed Kernig's symptom in a slight degree. Dermographia has often been seen. In 7 cases a lumbar puncture was made. The fluid was clear and stood under normal pressure. The reaction of Nonne was slightly positive in the case of van Wyke, and in 4 cases of Hacke. A slight pleocytosis was found 3 times. Once (Henkelom) the blood showed a slight leucocytosis, and once (van Wyke) the bacillus of van Hoogenhuyze could be cultivated from it, as is the case of influenza. In general the illness proceeded favorably, healing slowly or quickly. Twice death followed (Beck, Cramer). A pathologic anatomic examination of Cramer's case showed no macroscopic changes. A connection with influenza could not clearly be determined. Only 2 patients (Beck, Henkelom) had suffered from it half a year before. In 3 other cases the illness started like influenza, a few weeks earlier, and one woman's husband had had it.

Sensory Symptoms. Initial pains were found either in the back of the head (3 times) or in the abdomen and thigh (2 times, Hacke); others suffered from paresthesia (5 cases, one with strong itching) hypesthesia or hyperesthesia either in the region of the trigeminus or of the neck, trunk and limbs, one of a very constant nature (Kruisinga). Weakness or absence of the reflexes of the abdomen were found sporadically, sometimes the tendinous reflexes were more or less strong, and a positive reflex of Babinski has been temporarily present in the case of Leigenbeek, and an inclination to this was described in the first case of Hacke. Sometimes ataxic disturbances were mentioned as temporary phenomenon; Romberg's symptom was twice positive (Bosman, Kruinga).

Motor Symptoms. In the Dutch cases motor disturbances come to the front (14 times in 17 cases). 5 times hypertonia is mentioned, while tremors and convulsions, choreic and fibrillary in lips, hands, feet, arms, legs, muscles of the trunk, very different in strength, are mentioned 12 times; 5 times the patient walked uncertainly and very carefully.

Diseases of Cerebral Nerves. We did not often meet with symptoms of bulbar paralysis. Once there was salivation (Cramer). Once the patient had great difficulty in swallowing (Bosman). Once the tongue could, only with difficulty, be presented, and twice the patient had a low monotonous voice. Auditory and vestibular disturbances are not described. Six times the facial nerve was affected, mostly in a slight degree; 6 times the patient had a mask-like face. Twice there were slight motor differences between different parts of the face. Twice a unilateral, once a bilateral paresis. As we saw above there occurred 5 times an affection of the trigeminus, twice the corneal reflex was absent, 3 times the motor part also was disturbed.

Ocular Symptoms have also been seen in Holland, altho not so as to dominate the condition. In 8 cases ptosis occurred, it was more or less fugacious. In my two cases the ptosis was of such a slight degree that it impressed me as be-

ing the result of a change of the tonus, a parallelism can be drawn between this and the mask-likeness of the face, neither of which was the result of a real paresis.

Diplopia has been stated 8 times, 4 times combined with ptosis. In the case of Bosman it lasted only one day. Paresis could not always be determined. Van Wyke's patient alternately had crossed and homonymous diplopia. Thrice a slight convergent squint was noted (Beck, Hacke, Kruisinga and my second case in the beginning.) Kruisinga's patient suffered from a paresis of the abducens on the left side. The patient of Liégebeek van Henkelom had a divergent squint with paralysis and paresis of the superior recti, and probably also of the trochlears (de Haas). Temporarily, only the outward movement of the eye was present; in Cramer's case the patient had great difficulty in keeping the eyes in an extreme position, and in the 5th case of Hacke rotatory nystagmus developed, when looking to the left or to the right.

In comparing my own cases with the others published in Holland it struck me that mine showed many interesting symptoms which made them resemble none of foreign publication. Paralysis of the accommodation and convergence and anisocoria are missed in all Dutch communications. Liégebeek van Henkelom alone says that the left pupil of his patient showed less reaction than the right. And Hacke tells us that the left pupil of his first patient reacted little to light and convergence.

The most important symptoms which I found in my cases are: ocular diseases, paresis of accommodation and convergence, long lasting anisocoria, temporary rigidity of the pupil and disturbances of the associated ocular movements. The latter is also reported by Liégebeek van Henkelom only (paresis in looking upward). Before ending this article I will make some remarks on these interesting phenomena.

Visual Disturbances. In my cases the defects of vision are due to retrobulbar neuritis. Tho it is true that some cases of hemianopsia have been published, viz. Burrard and Greenfield, the regular form of the rings pleads against the improbable hypothesis that these rings should be interpreted as the accidental combination of bilateral hemianopic defects of a peculiar shape. Intraocular diseases and reflex disturbances of blood circulation to the intermedial part of the choroid or the ciliary vessels can be excluded. Moreover ring scotomas have been discussed in multiple sclerosis. (Uhthoff, Wilbrand, Sänger); in hereditary neuritis, (Wilbrand, Sänger); in lues, (Igersheimer, Marx); in retrobulbar neuritis (von Graefe), and have been made very probable in affections of the optic nerve arising from various clinical causes (Gjessing, Morgan, MacWhinnie, Russ, Woods, Haus). In some of the latter cases functional disturbances could not quite be excluded. I will draw the attention to two facts: 1. That in these illnesses the ring scotomas were not always isolated, but often connected with central scotomas or enlargement of the blind spot. 2. That the ring scotomas often had inconstant and capricious shapes.

Besides the above mentioned diseases and in glaucoma, ring scotomas have also been found by von Szily and Löhlein in papilledema. There also they had irregular shapes and developed gradually.

I have had the opportunity to find ring scotomas in several cases of glaucoma. They are broadest on the side opposite to the blind spot. As a rule there are here two half rings which are displaced from each other at the raphe of the retina. I found a more regular form of the rings not only in the above mentioned case, but also in two other persons. The first time in a young man of 21 years who had optic neuritis, nonluetic. Rhinologic examination was negative. When his neuritis improved under a treatment of KI, Hg. and sweating, the inflammation of the papilla gradually changed into atrophy of the upper third to fourth segment of the papilla, indirect image, which continued in a narrow white annular rim round the papillas. In a second case, a girl of 15 years, I had the left ethmoidal sinus opened, notwithstanding the negative rhinologic findings, and the ring scotomas showed a tendency to disappear. I found half rings in the front of Bjerrum's scotoma besides in glaucoma, also once in optic neuritis, once in neuroretinitis albuminurica.

Tho we have the right to conclude from the existence of ring scotomas that there is a retrobulbar neuritis, this does not imply that in accepting this we can quite explain the ring scotoma. In the visual field they lie between the central and peripheral parts of the retina, but that is no reason why they should be due to ring shaped fibres in the optic nerve. The above mentioned case of the young man with the segmental atrophy of the papilla and the observations in glaucoma, where there remains a free space between the paracentral scotomas and the peripheral scotomas, is significant. It would lead me too far to go deeper into this matter, or into the, as yet undecided, question whether the fibres situated in the axis of the optic nerve go to the periphery of the retina (Leber, Bunge, Fuchs, Van der Hoeve), or to the central parts of it (Passow, Uhthoff, Wilbrand-Sänger, Igersheimer, Seidel).

Paresis of Accommodation. Lethargic encephalitis is distinguished by strong polymorphism. While Cords says that paresis of accommodation belongs to the less frequent symptoms, Bollack tells us that it is the chief characteristic, as he found it in 90% of the cases (18 in 20) 5 times it was complete, 13 times it was a paresis. He adds that it may last for months. Bartels quite agrees with this, he reckons it among the prodromal symptoms and found it in 72% of his cases (8 in 11) perhaps even in 100%. Paresis of accommodation may also be found in syphilis, botulism, and diphtheria. In botulism it may be accompanied by a total paralysis of the sphincter, which is absent in diphtheria. This is important with a view to the differential diagnosis.

In Holland we found paresis of accommodation only in my cases, (this is 11%, namely 2 in 17). This is remarkable, 15 patients being younger than 40 years, so presbyopia cannot be the cause of this paresis not being noticed.

Paresis of Convergence. My cases are the only ones in Holland, in which paresis of convergence was mentioned, so this makes 11% (2 in 17). In my first case there was a paresis, in my second case the paresis developed into paralysis. The pupillary reaction in convergence was absent on the left side of one patient, and on both sides of the other patient. Bollack found it in 35% (7 in 20). Bartels has discussed paresis of convergence where the nervous impulse was unable to give a pupillary reaction. In his other cases the pupillary reaction was parallel to the degree of possibility of convergence. Cords presented 3 cases of paresis of convergence, in which twice the pupillary reaction was absent, tho the accommodation was normal. In one of these cases there was a temporary rigidity of convergence, while light reaction was present. When converging was again possible, the pupillary reaction also returned.

From my second case we learn that the fibre tracts for accommodation are separated from those for convergence, but that the latter are closely connected with those for the pupillary convergence reaction. The observations of Cords, Bartels and myself are interesting, because Bielschowsky tells us that normal convergence pupillary reactions exist in patients who are able to accommodate but cannot converge. My second observation is not in accord with this opinion of Bielschowsky. So there seems to result from the observations in lethargic encephalitis that a closer connection exists between the impulses for convergence and narrowing of the pupil than between the latter and the impulse for accommodation.

In my second case the paresis of the convergence had been preceded by an irritation of the convergence. Such an irritation of the convergence I also took for granted in a third patient (Fig. 4, Case 3). A man of 29 years suffered from the following symptoms: dullness, slight ptosis, mimical stiffness, and acute homonymous diplopia with convergent squint and normal looking fields.

Anisocoria. As the anisocoria which I found is one of the cardinal symptoms, it seems strange that it was not mentioned in the other Dutch publications. (Bollack found it in 70%, 14 in 20 cases.) The following possibilities exist. Either both pupils are wider than normal, or they are narrower than normal, and that in a different degree in both cases. One of the pupils is wider or one of the pupils is narrower than normal. It is remarkable that nowhere

in the literature are wide pupils mentioned. From this we must conclude that a complete paralysis of the sphincter did not occur.

Notwithstanding the dilatation of the pupil was only slight or quite absent, disturbances of the *pupillary reflexes* have been noticed, a few times also in the Dutch literature (see the above mentioned). The abnormal pupillary reactions seem to be of a transient and variable nature in contrast with the disturbances of accommodation. It was like this in my first case, and there exists no parallelism between them. A total rigidity of both pupils is very rare, but a total rigidity of one pupil also does not occur very often. There generally is a slow reaction, or a reaction with a slight amplitude. Bollack never found the symptom of Argyll-Robertson, which I observed during a few days in my second patient. The fact that my two patients also showed a total rigidity of the pupils is interesting too, especially in my second patient who had it in both eyes.

In order to explain the fact that the pupillary reflexes can be absent without the pupil being wide, Bartels accepts an irritation of the nuclei of the sphincter, because he noticed twice a contraction of the pupil during an attack of encephalitis, as sometimes occurs in meningitis. In this way he also explains the absence of dilatation in the dark. Tho this would explain the often short duration of the pupillary symptoms, too many difficulties are connected with it. In my opinion the pupil is, in most cases, not narrow enough to prevent further contraction; in cases of sympathetic paralysis the narrow pupil still reacts very well. Moreover it is difficult to accept a chronic spasm from the nuclei in those cases where the stiffness of the pupils remains for years. I do not agree with Cords when he says that an absolute rigidity of the pupils points to a damage of the nuclei of the sphincter, for this cannot explain that in his first case the width of the pupil was only 3½ to 4½ mm. On the other hand we are not compelled to accept a hypertonic or contracted sphincter, because it is not narrower than normal. Moreover in lethargic encephalitis we do not meet with a prolonged irritation of other nuclear regions, i.e., spasm of accommodation, etc.

I think we can explain it in the following way: because the nuclei of the sphincter must be small, the hypothesis is not hazardous, that all supranuclear reflex paths which attain this nucleus from about the same direction, must lie very close together in some place. Now if we accept a partial or total destruction of these paths, whether or not accompanied by a slight irritation or paresis of the sphincter nucleus, then many facts can be explained in a plausible way, i.e., the long duration of the condition, the restoration in a different sequence, the different combinations of symptoms, etc. Thus a normal reaction of convergence can be combined with an isolated paralysis of accommodation, and the other combinations above mentioned. That there should be no reaction in the dark gives no difficulty, because it is more probable that the wideness of the pupil in the dark is owing to diminishing of tonus of the sphincter, rather than to active irritation of the dilatator. My second case in which the internal recti functioned well separately, but converging was impossible, points to a supranuclear disease, just as the other cases of plain paralysis of the convergence. Cords' hypothesis is that a recovering sphincter nucleus should first react on the stronger impulse of light, and then on the weaker impulse of convergence. But accommodation is not of great value in my opinion, because we do not know if this sequence is found in all cases.

Paresis of the Associated Movements. We reckon among the associated movements of the eyes the movements of the bulbs in lateral, upward and downward directions. These, too, are often disturbed in encephalitis lethargica. This is combined with a total or partial contraction of the homonymous part of the field of fixation. It is noteworthy that in this disease the ocular paralysis in the vertical direction, which is very rare in general, predominates over the horizontal. Bollack found 4 times a disturbance of the upward direction, thrice of the downward direction, twice of both movements together, twice of the bilateral horizontal direction, once of a unilateral horizontal

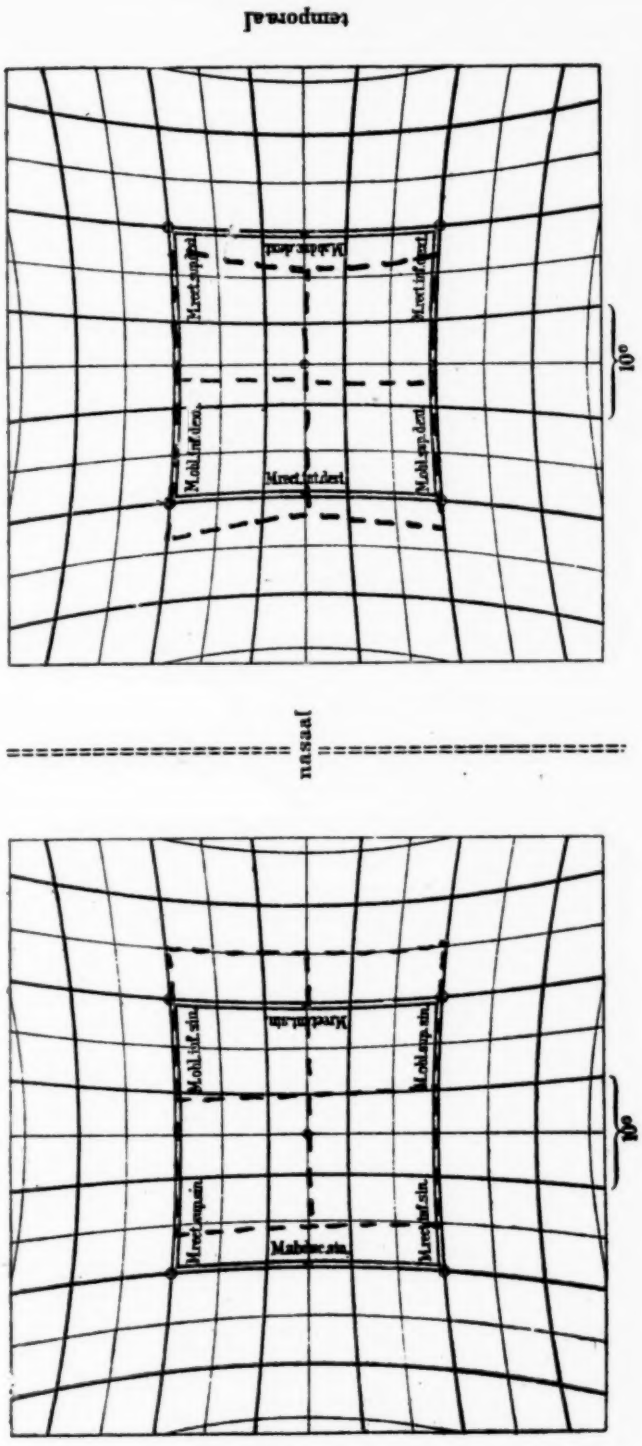

Fig. 4.—Fields of fixation showing irritation of convergence in Case III. (See p. 587.)

movement. Neither Bartels nor Cords ever saw a paralysis of the lateral motion. Cords gives no numbers, but he especially draws attention to the paralyses of the downward motion, which according to Uhthoff and Bielschowsky are as a rule very extraordinary. Bartels saw a paralysis of the upward as well as of the downward motion, without a noticeable preponderance of the latter.

So both my cases with paralysis and paresis of the downward motion are an illustration of what others have found also. The existence of a supranuclear vertical paralysis of vertical motion seems to me more difficult to prove, however, than that of a supranuclear lateral paralysis. For the former may just as well be due to a bilateral nuclear or an infranuclear affection. In my cases the disturbances of the fixation showed an inclination to get well, they did not, however, last such a short time as Bartels describes. One of my patients showed a nystagmus in the vertical direction, especially in looking downward, but also somewhat in looking upward. Nystagmoid convulsions have been mentioned in many publications and reports. They may be understood as belonging to the "nystagme saccadée," as a result of the struggle between the consciously directing impulse of the will and the impulses that draw unconsciously toward a deviating direction. Similar symptoms are found in latent nystagmus. According to Bollack the nystagmoid movements which can be induced artificially by moving the head, or of the visual fields, occur in three ways: either simultaneously with a paresis, or during the restoration of a paresis, or even without paresis. In the latter case it is a sign of a disturbance of the associated movements as it is in disseminated sclerosis. Bollack found it 8 times in a horizontal, 6 times in a vertical and 2 times in both directions.

Whether symptoms of vestibular nystagmus occur in lethargic encephalitis is somewhat difficult to decide. Bartels, as well as Bollack, thinks this is the case. Bollack has examined 7 patients and has found 5 times a disturbance of the caloric nystagmus, and once of rotatory nystagmus. From that he concludes that there is a disturbance of the vestibular nuclei, or of the connective fibres between them and the nuclei of the oculomotors, or the tonic centers of the conjugated movements.

Localization of Nuclei and Fibres. It was hoped that the study of lethargic encephalitis would help us in the localization of the tracts, fibres and nuclei. Yet we have not gotten much farther than the hypothesis. The paralysis of convergence which has been observed speaks for the existence of a center of convergence, which is placed by Bartels and Edinger in the median nucleus of the oculomotors which consists of great cells. Bernheimer held this to be the nucleus of accommodation. The most frequent combination of paralysis of the ocular muscles is ptosis and a disturbance of accommodation. This is why Bartels accepts that these nuclei must lie close together. Cords and Bartels also surmise the center of the levator and the supranuclear fibres or center of fixation to lie close together, by reason of combined paralysis of both. Until now a disturbance of the upward and of the downward fixation has only been accepted in the rare diseases of the corpora quadrigemina. Spiller (Handb. d Neurol. 7, 2, p. 735) has found an affection of the corpora quadrigemina near the aqueduct in 19 out of 20 cases of vertical paralysis of downward fixation. An isolated disturbance of the downward fixation has not been discussed in these cases. The supposition that disturbances of the upward fixation should be due to a disease of the posterior corpora has not been justified by experiments on animals. The disturbances of the lateral fixation, which only Bollack has observed, must be ascribed to an affection of the fasciculus longitudinalis posterior.

It seems to me that these investigations have as yet not given many results, and even are unable to give them, firstly because of the diffuse extension of the processes, secondly because we possibly make a mistake by

localizing the frequent combinations of paralyses close together. We should not forget that besides the oculomotors, the facial, which lies at a great distance is often attacked. In order to explain all the other symptoms also we must accept foci to lie more dispersed rather than to be in continuous connection. Just as in diphtheria, botulism and other diseases, we must accept an eclectic action of the virus for definite cerebral parts. The nucleus of the trochlearis which lies close to that of the oculomotor often seems to be saved. The diagnosis of such a case being, however, very difficult, it may be sometimes overlooked. Often the nucleus of the abducens is affected without giving rise to disturbance of the lateral fixation. This justifies Marburg's opinion against that of Bing.

I cannot judge whether the frequent paralysis of the facial is a paralysis of the nucleus or whether it is owing to a damage of the superficial knee of the facial. It is very remarkable that the isolated paralysis of the muscles provided by the oculomotor were scarcely ever total (Bartels, Bollack), but either a paresis or a muscular asthenopia. In my opinion this is also the case in ptosis and in paralysis of the facialis. It might be asked whether among these there are also motor disturbances of the same nature as the extrapyramidal ones. I do not agree with Bartels when he supposes only the nuclei to be attacked, and the cerebrospinal fluid only being the source of infection and this for the following reasons:

1. Cases are known of hemiplegia and hemianopsia.

2. Bollack found disturbances of the lateral fixation (fasciculus longitudinalis posterior).

3. It is not certain that there really exist supranuclear centers for the associated movements and the convergence.

4. The diseases of the optic nerve can be well explained only by defects of fibres.

5. Bilateral isolated paralyses of the ocular muscles occur without affections of the nucleus (Meyerhof's case of hemorrhagic encephalitis with bilateral paralysis of the abducens).

6. The long lasting disturbances of the pupillary reflexes without strong dilatation of the pupil plead more for affection of the reflex tracts than for a spasm in the nuclei.

7. The pathologic anatomic researches showed diffuse processes, generally perivascular, so that besides an infection via the cerebrospinal fluid, there also must be accepted an infection via the blood circulation.

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OCULAR MANIFESTATIONS IN ENCEPHALITIS LETHARGICA.

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This paper reports the frequency of the disease recently in Wisconsin. It gives the usual eye symptoms and the histories of four cases. Read before the Wisconsin Surgical Association, May, 1921.

This most interesting disease has been named Encephalitis Ophthalmoplegia; Encephalitis Lethargica; Epidemic Encephalitis and sleeping sickness. It must not be confused with the sleeping sickness of Africa.

The record of the deaths reported in this state during the year 1920 was 26. This year in January there were 4 deaths, in February 13, and an incomplete report for March with 14 deaths recorded.

In Milwaukee twenty cases have been reported since January 1, 1921, with eight deaths. In New York City during the first four months of this year two hundred and eighteen cases were reported.

The ocular manifestations appear early in nearly all instances and are frequently the earliest symptoms complained of by the patient. The ophthalmologist must not overlook the causal factor when the patient complains of double vision or drooping of the eye lids. I believe there are a large number of these cases with us, but the symptoms are so mild and transient that they are not attributed to the encephalitis. Every case should be reported in order to obtain accurate statistics.

The eye symptoms in order of frequency are as follows: diplopia, ptosis, impaired accommodation, nystagmus, sluggish pupils, optic neuritis, papilledema. It is the tendency for the ocular symptoms to result in recovery and therefore the prognosis of eye disturbances is good if the patient survives.

The diplopia, due to motor paresis or paralysis, is of central origin and is usually transient. The nerve involvement in order of frequency is the 6th, 3rd and rarely the 4th. The latter is easily overlooked because it is not seen when ptosis appears or when the patient is in a stage of lethargy. The diplopia is noted in the distance and in every direction but I have never seen one that complained of this disturbance while reading. The vision is usually normal in the distance as well as for the near. The motility is also preserved in most cases. This symptom is usually the first to disappear, but may recur and affect the opposite eye. The pathology is unknown.

The ptosis is bilateral usually and may be complete but is frequently partial. In the state of lethargy, the lids may be closed and opened with great difficulty. A tremor of the lids is frequently observed in this disease. The ptosis is due to weakness of the levators. Ptosis combined with ocular paresis is rarely met with in any other disease and is pathognomonic of encephalitis lethargica.

Impaired accommodation is manifested by quick fatigue and the emmetrope cannot read even at arms length. This symptom is the last to leave, persisting sometimes for many months. The pupils are frequently sluggish in action and there may be irregularity and inequality, bilateral usually. The pupils in some cases remain dilated and fail to react to light.

The nystagmus may be slight or pronounced. Sometimes merely nystagmoid twitching is seen. The facial nerve is sometimes involved and this usually unilaterally. There is rarely lagophthalmus.

Optic neuritis is manifested by a blurring of the optic disc, probably due to dilatation of the capillaries with resultant congestion of the retinal veins.

Papilledema is a rare condition. I can find only two cases on record and I wish to add an interesting case with particular symptoms in my report of cases. There is probably a subcortical hemorrhage or edema cerebri, or both,

responsible for this symptom. This condition, in every case reported, was unilateral and the same holds good in the case under observation.

The causative organism has been isolated by Drs. Loewe and Strauss of New York, and recently confirmed by Dr. Thalheimer of Milwaukee.

Differential diagnosis must be made between this disease and brain tumor, extradural abscess, meningitis, T. B. or serous, uremia of diabetic coma, lues, cerebrospinal, hysteria.

CASE 1. Miss M. W., aged 24. Family history and previous history negative. General condition good. Glasses, worn for myopic astigmatism, bring her vision up to normal. Onset July 7, 1920, with left facial palsy, vertigo and double vision. No fever. Headache slight at rare intervals.

Eye symptoms: Ptosis slight, bilateral; diplopia beyond 15 inches from the eyes, and in every direction. Paresis left 6th nerve, marked from July 7, 1920, to December 23, 1920; when, after an interval of two days, there was a noted paresis of the right external rectus. The facial on the right was also attacked at the same time. Nystagmus horizontal and bilateral to a marked degree. Pupils sluggish and dilated bilaterally. Accommodation decidedly weak. Papilledema was noted on February 1, 1921, in the left eye. The patient complained of pain and a decided fog before the eye. A definite choked disc, amounting to three diopters, was observed by the writer and verified by Dr. Koch. This condition gradually declined until on April 12th, when no edema of papilla existed, and the patient's only complaint today is a blurring of the print in the near.

The neurologic examination was negative. Spinal fluid negative and pressure normal.

CASE II. J. L. Age 16. Three weeks previous to entrance to Hospital (Feb. 15, 1921) patient became dizzy especially on change of position of head, very restless, garrulous and did not sleep at night. Physicians had to prescribe powder to produce sleep. Following this early period of 2 weeks of excitement, patient became depressed and then later lethargic.

On entrance to hospital patient showed the "indifferent" attitude answering only at time when spoken to. Two days after entrance to hospital when patient was asked a question, response was a series of unintelligible sounds. Patient gradually became worse, lethargy deepened, later passing into coma. Fever was slight on entrance, but gradually increased about 0.3 of a degree each day and suddenly taking a jump from 103 to 106 two days before death and reaching 108.4 just before death. Patient had no headaches, the first symptom being marked dizziness, especially on change of posture. There was some weakness of left side of face.

Eye Symptoms: No diplopia could be elicited. Bilateral ptosis present. Lack of synergic action of eyeballs but no strabismus present. Slight vacillatory movement of eyes, especially to right. Right pupil larger than left. Left somewhat irregular but reacts sluggishly to light. Accommodation unobtainable. Both fundi normal.

Spinal fluid; Wassermann negative; globulin, plus; cultures, negative; cell count 15 on entrance, 180 three days before death; fluid under great pressure, about 180 drops to a minute; fluid always crystal clear.

Family history, negative. Patient lived in Missouri and had malaria. Otherwise past history negative. Extradural abscess was the diagnosis by one of the consultants.

Post Mortem Record, made by Dr. Margot.

No abnormal external appearances of note were found. The scalp and tissues over the calvarium appear normal. The dura was not adherent and was white and glistening. The superior longitudinal sinus was empty. The pia was quite cloudy and opalescent due to marked edema of the left meninges. There were no gross hemorrhages, except very fine pin point in ventricles.

Microscopic examination: Perivas-

cular infiltration of the vessels of the white matter, especially of the caudate and lenticular nuclei, optic thalamus, pons and posterior horns of the cord, edema and miliary hemorrhage of surrounding parts.

CASE III. Mr. C. U. O., aged 24. General condition poor. Family, as well as personal previous history negative. Onset present illness December 24, 1920, with history of blurring of vision and double vision. No fever or headache at any time. Lethargy began Jan. 1, 1921, but not marked, and persisted for about two months. The left facial and also the left arm were paretic.

No history of influenza. The spinal fluid and blood upon examination were found negative.

The *eye symptoms* were: Ptosis bilateral and partial; the left more marked than the right lid. Diplopia from December 24th, 1920 to January 8, 1921. Paresis of the 3rd, 4th and 6th nerves, of left eye. Nystagmus lateral, bilateral and rhythmic. Pupils sluggish to light and accommodation.

CASE IV. Mr. J. C. N., aged 39. General condition good. Family, personal and previous history negative. Onset present illness December 27, 1920, with nausea and vomiting, at the same time a parotitis with excessive salivation was present. No fever or headache. Lethargy not present. The man was able to keep up his work. No history of influenza. The spinal fluid and blood were negative.

The *eye symptoms* were as follows: Ptosis partial, left lid especially. Diplopia due to pareses 4th and 6th nerves left side. Nystagmus, horizontal and bilateral. Pupils irregular and somewhat sluggish to light and accommodation.

THE BARRAQUER INTRACAPSULAR CATARACT OPERATION

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AND
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This paper records impressions gained from a visit to Professor Barraquer's Clinic at Barcelona. The immediate and later results of his operation were observed. His use of vibration to loosen the lens from the suspensory ligament and his difficulty in getting instruments perfectly adapted to the purpose are stated.

The intracapsular cataract operation has evoked a great deal of discussion and criticism during the last decade. While a few modifications of the Smith-Indian technic have appeared from time to time nothing of great importance had been devised until Barraquer of Barcelona published his first paper upon phacoerisis.

In order to judge the value of this method, we spent eight days in Barcelona with Dr. Barraquer and during that time he showed us a series of operations and took great pains to demonstrate to us the details of the technic and the mechanism of the erisiphake. He also gave us the privilege of examining the patients before and a few days after the operation, as well as a number of cases that had been operated upon as long as three to four years prior.

As we saw the operation in Barcelona, the method consists of the production of a vacuum by a special electric motor, causing a very small cup to adhere to the anterior capsule of the crystalline lens; and the simultaneous transmission of vibrations to the fibers of the zonula. Barraquer attaches a great deal of importance to those vibrations as he claims that they rupture the fibers of the zonula, thus permitting the extraction of the lens with the least possible traction upon the ciliary body and without pressure upon the eye; and it is this absence of marked traction and pressure which makes this operation superior to the other intracapsular modifications.

Rules can not be formulated at present, as to the amount of vacuum and number of vibrations necessary in each case, as that is the result of practice based upon a very careful examination of the patient. The knowledge thus gained serves as a guide to the amount of vacuum and the number of vibrations to be developed in each individual case; thus the harder the cataract, the greater must be the vacuum and the larger the number of vibrations produced, to put the capsule on sufficient tension and facilitate the rupture of the zonula. Conversely the softer cataracts require a smaller amount of vacuum and fewer vibrations.

It is to be regretted that until now the proper instrument has not been obtainable. This is due to the fact that Barraquer has been constantly perfecting it, and also to the difficulty in getting artisans sufficiently skillful to make an accurate instrument. It is true that some instruments have been sold but they were not with the approval of Barraquer who recommends only those obtained from Cusi which are tested personally by Barraquer before they are put on the market. The operating results with other makes were not satisfactory, and this gave rise to a difference in the results obtained by other operators.

Of the operations that Barraquer performed in our presence, there was loss of vitreous once, and the amount was very slight; when the toilet was completed, the pupil was round. When the patient was seen upon the first dressing a few days later, there was practically no reaction, the wound was apparently healed and the pupil round. In another patient, the capsule ruptured and the operation had to be continued as in the capsulotomy method, the lens matter expressed; and very little cortex was left behind. The re-

sult was in no way different from the ordinary capsulotomy operation with forceps. The patients were not selected as there was one diabetic and another nephritic. Some of the cataracts were immature and one was Morgagnian. Before the vibrations were incorporated in the instrument, Barraquer had cases of intraocular hemorrhage. But since then he has had no hemorrhages.

After completing the toilet, eserin salve is applied between the lids, both eyes are bandaged and the patient walks to his bed. In private practice, the patients are operated upon in his office and are allowed to go home immediately afterwards, as Barraquer does not fear prolapse of iris or loss of vitreous. The comparative freedom from a tendency to iris prolapse and loss of vitreous he explains in this way: In contradistinction to those cataract operations dependant upon expression of the lens, his operation is one of extraction after the fibers of the zonula have been broken. Thus there is less tendency for an outflow of the intraocular contents, than would be the case with other cataract operations.

CONCLUSION.—The Barraquer operation impressed us very favorably, and perhaps with slight modifications by the originator, will probably become the operation of the future, for of all intracapsular operations, this appears to be the safest. But it must not be thought for one moment, that it is an operation for an amateur to undertake. In the first place a proper instrument is essential; and in the second place the highly developed skill and technic that is required in all cataract operations is even more necessary in this.

A SIMPLIFIED INTRANASAL OPERATION FOR OBSTRUCTION OF THE NASOLACRIMAL DUCT

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In this operation the inner bony wall is removed over both the lacrimal sac and duct, and both sac and duct are opened. Five illustrative cases are given. Read before the Chicago Ophthalmological Society, March 21, 1921.

There have been published a great many intranasal operations on the lacrimal sac and nearly all attempt to make an artificial opening from the lacrimal sac into the nose. These openings have a natural tendency to close. They do not restore the normal function of the nasolacrimal duct and all of them require considerable skill to perform.

Yankauer on the other hand has devised an operation resecting the mucous membrane from the anterior end of the inferior turbinate, removing the inner bony wall of the lacrimal canal, incising the duct and thereby restoring the normal function of the duct.

To my mind, if we use any surgical procedure which does not attempt to restore the normal function of the duct we have failed to do our full duty.

The reason why the nasolacrimal duct becomes obstructed so frequently is because it is surrounded by a bony wall, and whenever it becomes inflamed it cannot expand sufficiently on account of the bony wall. This bony barrier acts the same as the skull in intracranial pressure, due to edema of the brain, which can be relieved only by decompression. The bony wall of the lacrimal canal acts the same as an irritant to inflamed ducts and thus produces a chronic inflammation in the nasolacrimal duct. This is the reason why probing the duct does not give us the results which we naturally would expect. Merely removing the inner bony wall of the duct and slitting the membranous duct is not always sufficient to establish a cure in suppurative cases. I have found that by removing the inner bony wall over the duct and lacrimal sac, slitting the sac as well as the duct, gives better results. By doing so we allow the sac to drain above, while the duct is healing and eventually the duct functions and the opening in the sac closes leaving a normal functioning lacrimal apparatus.

An artificial opening from the sac into the nose does not drain the tears as well from the eyes as a normal lacrimal apparatus because in the latter the gravity of the tears in an inch and a half tube facilitates drainage.

The object of this paper is to present a simplified intranasal operation on the lacrimal sac and tube, which can be readily performed by rhinologists and ophthalmologists.

The nose is thoroly anesthetised with adrenalin and flakey cocain. The lower canaliculus is dilated and with a syringe a few drops of a 10 per cent solution of cocain in adrenalin are introduced into the sac. In nervous patients it is wise to inject the infraorbital nerve with novocain and administer 1/4 gr. of morphin hypodermically one-half hour before operation. I have occasionally injected novocain between the sac and the lacrimal bone as well as into the lacrimal groove.

The anterior end of the inferior turbinate is removed with bone forceps as close as possible to its attachment and just beyond the duct opening. A grooved lacrimal probe is now introduced thru the lower canaliculus and passed thru the nasolacrimal duct into the inferior meatus of the nose. The probe should be as large as can be passed without force and without injury to any structures. An incision thru the mucous membrane is made from high up just in front of the middle turbinate down to the edge where the inferior turbinate has been removed terminating just anterior to

the probe. The membrane is elevated forward and backward which makes two triangular flaps with the apices above. A special nasal chisel hollowed out with dull corners is placed at the anterior crista of the inferior turbinate as illustrated in Fig. 1. About ¼ of the circumference of the bony wall is chisled away. The anterior portion of the lacrimal bone and the posterior portion of the frontal process of the superior maxillary bone have a depression on the orbital side in which lies the lacrimal sac, and the depression causes a bulging or convex elevation in the nose over the sac which makes much less trauma than the removal of a section of the sac; and if the incision is long it drains better and there is no danger of cicatricial contraction of the sac.

Nearly all the operators who advocate making an artificial opening from the sac into the nose speak of after treatments being required, such as caustics to destroy granulation and frequently passing a probe to keep the opening open. It is my opinion that if it is necessary to use caustics and probes after operating our chances are very slim to establish permanent drainage. It is very common after the

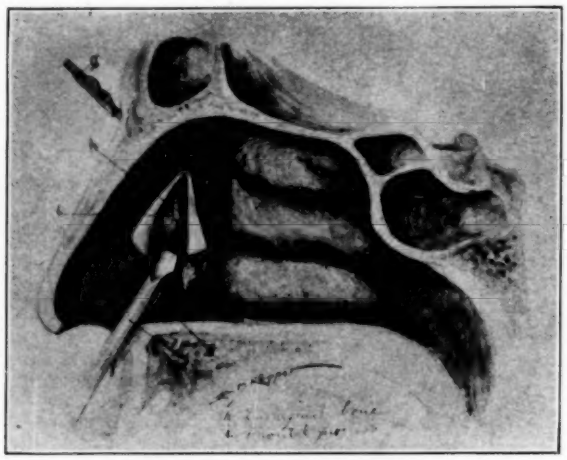

Fig. 1.—Special chisel in position to remove inner fourth of bony wall of nasolacrimal canal.

it easier to chisel. This elevation of bone is chisled off up to about the middle of the sac. A small crow-beaked knife is now placed into the groove of the lacrimal probe, Fig. 2, and the duct and half the sac incised. The flaps readily fall into place and the operation is completed. There is no after treatment required. By using a chisel, instead of bone forceps, we avoid injuring the membrane duct, and a larger section of the bony canal can be removed and one can always have the lacrimal probe for a guide. By biting off the anterior end of the inferior turbinate we can do no harm to the duct. The flaps do not need to be sewed as they remain in place. A longitudinal incision thru the sac causes pseudoopening operation to find the patient blowing air and mucus into the eye when blowing the nose. I have not observed this in any of my cases. It has been a common practice for years to slit the canaliculus in cases of dacryocystitis, but this practice is hitching the horse to the wrong end of the wagon. An eye with a slit canaliculus never looks normal nor drains the tears as readily as a normal canaliculus. It is my opinion that this should never be done except in lesions in the canaliculi or upper portion of the sac. Some operators describe the slitting of the inferior canaliculus as a part of their procedure in doing an intranasal operation on the sac. This destroys the capillary action of the

canaliculus and makes the gravity of the tears practically nil as the distance from the artificial opening in the sac to the common opening of the canaliculi is extremely short. Dr. Mosher says that all intranasal measures face danger of reclosure of canal and are only a temporary success, and that frequent probing and the wearing of styles is necessary. I have not failed thus far to restore the function in any case that I have operated and I have not carried out any after treatment whatever except the use of a few drops of adrenalin 1-20000 in the eye morning and night and occasionally injecting a little argyrol into the canaliculus with a syringe to demonstrate to myself and to the patient that the argyrol comes out thru the nose. The following five cases were the most difficult I have encountered thus far:

Case I. Mr. H. A. D., age 25, Marshfield, Ill. While a truck driver in France during the war had a collision and fractured his superior maxilla on both sides and also fractured the nose. Since that time his eyes were inflamed and teared constantly. He could express pus into the eyes by pressing on the tear sacs. Probes could not be passed into either inferior meati. Septum was crushed and was thickened so that the nose was obstructed in front. Was obliged to do a submucous resection. Chisled away bony wall of lacrimal duct on either side before I could pass the probe and use it as a guide. Operated both ducts and septum, 6/13/19.

Case II. Mr. W. B., age 22, Milwaukee, Wis. Sent to me by Dr. D. Fiske. Was struck by a coal shovel in one of the navy boats fracturing superior maxilla on both sides causing dacryocystitis on each side. Could not pass probe into nose on either side. Operated left side, 10/10/19.

Case III. R. J., Chicago boy, two years old. When eight weeks old baby had a fall and ever since has had a suppuration in the right lacrimal sac which caused the right conjunctiva to be continuously inflamed and the upper lid drooped somewhat. On account of the small nasal opening I had to do most of the operation by sense of touch.

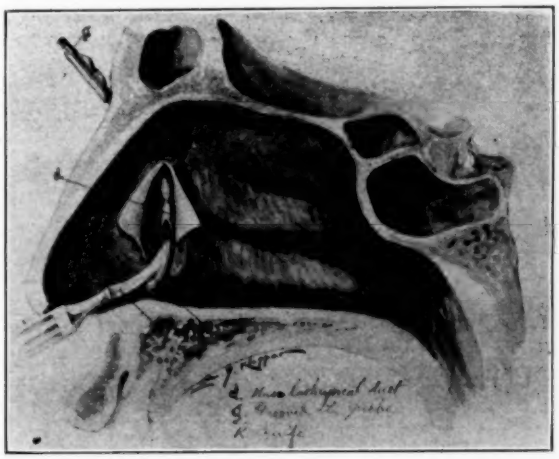

Fig. 2.—Crow-beaked knife in groove of lacrimal probe to incise the lacrimal duct and lower half of the sac, after removal of bony wall.

Case IV. Mr. H. G., age 38, Chicago. Sent to me by Dr. Chas. Goldberg. Patient says four years ago a barber accidently dropped some lotion into his right eye, which caused a marked inflammation of eye with a reddened area over the region of the sac, but this disappeared. A few years later a reddened pimple appeared over the sac but disappeared. Last December patient developed an acute plegmon of

the right lacrimal sac which ruptured leaving a persistent fistula. Mar. 13, 1921, performed operation. Could not easily pass lacrimal probe thru canaliculus on account of congestion so I used the fistula instead. About two drams of pus were expressed from the fistula before starting to operate.

CASE V. Mr. F. J. R., age 35, Chicago. Sent to me by Dr. Earl B. Fowler. Has had chronic dacryocystitis of left eye for many years. Has been probed and washed out many times without benefit. There was considerable swelling and infiltration so that the tissues felt rather hard to touch. Pus could be squeezed out by pressing sac. Operated 4/20/20 and in two weeks the patient's appearance was normal and the sac functioning.

SUBCONJUNCTIVAL DISLOCATION OF THE CRYSTALLINE LENS.

GEORGE C. ALBRIGHT, M.D.

IOWA CITY, IOWA.

This is the report of a case in which with very little reaction the crystalline lens seems to have become dislocated beneath the conjunctiva; subsequently without exciting much discomfort it escaped thru the conjunctiva and was removed thru the lower culdesac. The sclera had become previously thinned by glaucoma. The patient was one who made much less than the usual complaint of any form of discomfort.

In view of the apparent rarity of subconjunctival dislocation of the crystalline lens, and the still further rarity of subsequent spontaneous or traumatic expulsion of the lens from beneath the conjunctiva, it might seem that the following case may be of interest to ophthalmologists.

Mrs. E., age 70, first consulted me in May, 1918 for some nasal trouble. The history given indicated and the findings showed that she was suffering from an old atrophic rhinitis. I had known the patient for years in a social way, and knew she had had considerable trouble with her eyes. The history of the eye trouble was not elicited until some two years following the above date. The patient had sufficient vision to get about, attend to her housework, go and come for short distances by herself. Her eye trouble had extended over a period of several years and at this time she was still under the observation of a competent ophthalmologist. Knowing this, I did not question her regarding her eye trouble nor make any examination, my whole object being to make her more comfortable by caring for her nasal condition. At intervals during the year 1918 she consulted me for palliative treatment of the nose for the crusting and the discharge which were at times quite annoying. I did not see her during the year 1919.

On February 14, 1920, she came to my office complaining of some trouble with her left eye. She stated that while at work about ten days previous she had noticed a little tenderness in the left eye, but no real pain. The trouble began, she thought, when she accidentally struck the eye with her thumb or finger temporo-inferiorly. The eye seemed to pain her a little at that time, but nothing acute, no redness. Since that time it had felt as tho there were a foreign body in the eye, but no attempt had been made to remove it. The right eye was artificial.

Examination of the left eye: The temporo-inferior portion of the iris is obliterated except for a very narrow margin temporally. The iris is tremulous, the entire iris is misplaced, the pupil being to the external inferior part of the iris, approximately seven millimeters in diameter, altho very irregular in outline. A thin band of iris, four millimeters wide at its base and two millimeters at its apex, extends downward across the pupillary opening and is attached at its apex behind the margin of the iris, temporo-inferiorly. The pupil is clear black each side of this band. Surrounding the cornea, the sclera is clear, attenuated for a distance of two or three millimeters. Just external to the limbus and inferior to the horizontal meridian, there is a pigmented scar about four millimeters long, apparently scleral. At the outer end of this scar there is a small elevation of the bulbar conjunctiva which is filled with spots of scattered black pigment. This same pigment was found along the entire length of the scar.

Right in the inferior fornix there was found a dark yellow lenticular shaped mass about four millimeters in diameter, perfectly free from all attachments and which was readily lifted out with a cotton tipped probe. No evidence could be seen of the scleral scar from the fundal aspect. No evidence of the lens could be seen in the vitreous. Diagnosis at that time was made that the lens had been extruded thru the sclera and conjunctiva.

The mass secured from the fornix was submitted to the pathologist for examination, who returned a report that the mass was microscopically a cataractous crystalline lens.

Following this, I secured from the patient's daughter the following eye history. It should be said that the daughter had lived with the mother constantly and cared for her, also that the daughter had worked for years in the office of an ophthalmologist, consequently her history would be more accurate than the usual one.

The history that she gave me without my questioning her at all, was as follows: Her mother had been troubled for probably thirty years with eye trouble, said to be secondary to tooth trouble. Early in her acute trouble the right eye was enucleated, fearing sympathetic trouble in the left eye. The condition in the right at the time of its enucleation she did not know. About twenty years ago the patient had had a downward iridectomy in the left eye for glaucoma. Following this, the vision improved for about one year, when it began again to fail and the patient was told that a cataract was developing. The cataract progressed very slowly and without any increased glaucoma. The surgeon expected, so the daughter understood, to do a combined cataract extraction and trephining operation.

In December, 1916, after twelve years or more of waiting, the vision had become so bad the patient could only tell light from dark. At this time, one day when stooping over she accidentally struck her left eye against a brass knob of a bed post. The pain was only slight, but the daughter noticed blood in front of the iris. The patient was immediately removed to the hospital where she remained for weeks under treatment, but with no operative interference. When ready to leave the hospital the patient could see very much better. The surgeon told the patient and daughter that the cataract had been dislocated backward, to the outer side and below, and advised no active treatment. During the past four years the eye has been quiet and the degree of vision about stationary as above noted.

The past year, the daughter states, she had noticed a small yellow lump beneath the conjunctiva inferior and just outside the limbus. Lately she had noticed this lump was gone. She made these observations and gave the above history before being told of finding the mass in the fornix, above mentioned.

The patient has since passed away, result of a cerebral hemorrhage. No postmortem examination of the eye could be made.

In the light of the history and our findings, we must conclude that following the traumatic dislocation of the lens in December, 1916, the lens has rested against the sclera in an approximately fixed position. Owing to the glaucoma, the sclera had become greatly attenuated in the region of the limbus which is, as is well known, the weakest part of the sclera next to the optic disc. Either some very slight traumatism or perhaps a gradual softening had caused the cataractous lens to be extruded thru the sclera beneath the conjunctiva, carrying with it small bits of the choroid which later pigmented the scar. As a result of the very slight injury received in February, 1920, the lens was extruded thru the conjunctiva where it remained in the fornix until removed.

Fuchs, de Schweinitz, Roemer, Zentmayer, mention the possibility of traumatic subconjunctival dislocation of the lens. The case which I have reported cannot be definitely said to be traumatic, but is more probably traumatic than spontaneous. The patient's general tonicity was the lowest that I have ever seen and her reaction to trauma or irritation about the slightest. This might account for the ease with which the lens was extruded thru the sclera and would certainly have a bearing in explaining why the lens mass would remain in the fornix as a foreign body for the week or ten days

after its expulsion thru the conjunctiva.

To illustrate this low tonicity and slight reaction to irritation I might cite an incident which had no direct bearing on the eye condition but is interestingly illuminating. A few months after the eye trouble in February, I was called to see her at her home. She stated that while spraying her throat with a DeVilbiss atomizer, the acorn tip had fallen off and that she believed it was lodged somewhere in her throat. Altho it was four hours since the accident, she was apparently suffering no inconvenience except for a feeling of something in her throat. Taking a wooden tongue depressor and pressing the base of the tongue forward, the tip of the atomizer was seen resting in the pyriform recess to the right of the base of the epiglottis, from whence it was easily lifted out by means of a small Hartman's nasal dressing forceps.

NOTES, CASES AND INSTRUMENTS

A POINT IN THE TECHNIC OF IODIN TREATMENT OF CORNEAL ULCERS.

HAROLD GIFFORD, M.D., F.A.C.S.
OMAHA, NEBRASKA.

Tinctur of iodin is useful in torpid corneal ulcerations especially of the herpetic or dendritic variety. In its ordinary form, however, it is difficult to use both effectively and carefully, because it evaporates so quickly that unless the application be made with reckless rapidity, the swab is apt to become so dry that it produces no effect.

To meet this difficulty, I have put ten or a dozen iodin crystals into a 10-15 drops of the ordinary tinctur, keeping it in a small bottle. I have found that the syrupy liquid thus produced is free from the objection first mentioned, besides being more effective.

Where a less concentrated tinctur is desired, the difficulty can be met by adding 5% of glycerin to the ordinary tincture as suggested by my friend and former assistant, Dr. R. C. Person, now of Maryville, Mo. With either of these forms of tinctur, the iodin can be applied with the same care and thoroness that is possible with trichloracetic acid.

AN ILLUMINATED TEST-CARD HOLDER FOR NEAR.

ALFRED COWAN, M.D.
PHILADELPHIA, PA.

The value of testing the visual acuity for near as well as for far depends on an even illumination of the test object. Cards at a distance being fixed, the intensity of the illumination is always the same.

The near test object must necessarily be so arranged that it may be placed at different distances from the patient and the intensity of the illumination is changed unless the source is made to follow the object. This is accomplished by the device illustrated—a test-card holder containing the light. The construction is admittedly crude and one mechanically inclined may suggest some improvements and modifications. It consists merely of a 10 watt lamp enclosed in an opaque shade with a ground-glass covered slit

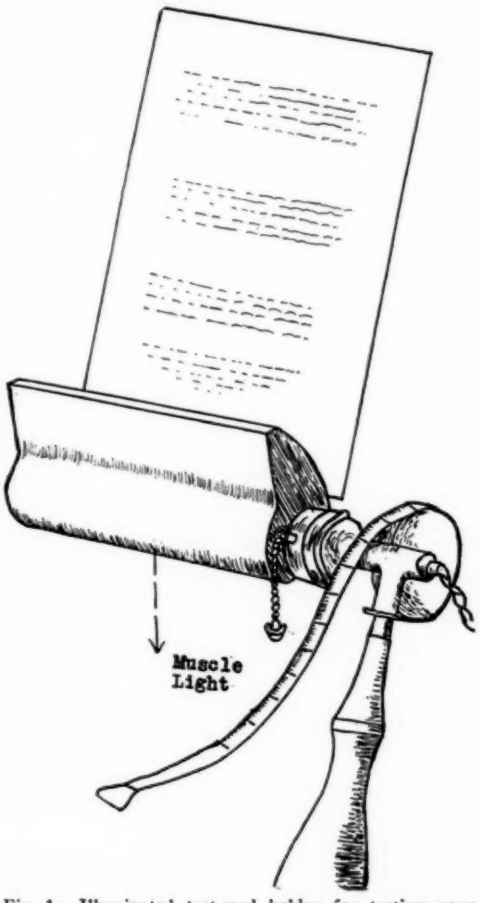

Fig. 1.—Illuminated test-card holder for testing near vision. (Cowan).

thru which the light is thrown on the card. It is connected by a cord and plug to an ordinary outlet. Any test type or other object may be used.

On one side is a compact one meter tape with a spring roller for measuring the reading distance or the near point.

Beneath and slightly behind there

is drilled in the shade a one millimeter opening, so that by elevating the handle, which is to one side, a convenient light is had for making muscle tests.

The back is so arranged that it may be hung on the wall when not in use.

This holder seems to combine in compact form all near tests and being held thruout by the patient, the operator has both hands free.

A MAGNETIZED KNIFE TO EXTRACT SMALL MAGNETIC FOREIGN BODIES FROM THE ANTERIOR CHAMBER.

JAMES M. PATTON, M.D.
OMAHA, NEBRASKA.

In extracting small magnetic foreign bodies from the interior of the eye by the corneal route, I remember on one occasion having difficulty due to the foreign body's becoming pinched in the iris angle as a result of a slight loss of aqueous on making the corneal incision. It has been our custom to use the inner pole or ring magnet of Mellinger as well as our giant magnet. The patient is able to lie comfortably on the operating table with the ring arranged in such a way that the injured eye is as near its center as possible. The soft iron "electrode" becomes strongly magnetized on approaching the center of the ring and the traction on the foreign body can be controlled to a nicety. This is most important in teasing a small foreign body around the pupillary margin of the iris into the anterior chamber. The tips of the "electrodes" can be of various shapes and sizes, either relatively large, which gives stronger traction, or small and delicate for use in the lips of small incisions.

Recently, while attempting to extract a small foreign body from back of the iris, I had drawn it around the pupillary margin into the anterior chamber and, as is our custom, prepared to make my corneal incision without removing the ring from the patient's head. My assistant failed to turn off the current when I made my incision and I was much gratified to see the foreign body move quickly to the point of the knife and remain in that position after the knife was removed, apparently adhering to the lips of the wound. It was then easily removed with the "electrode" of the inner pole magnet. I have tried this repeatedly with very satisfactory results. It is possible to remove the foreign body in this way with practically no loss of aqueous.

When using the giant magnet, a Graefe knife can be magnetized by placing it in contact with the tip of the magnet for a few minutes. It is then sufficiently magnetized to attract the foreign body, altho not so strongly as when used in conjunction with the inner pole magnet.

BILATERAL DISLOCATION OF CRYSTALLINE LENS, REMOVAL.

W. G. PUTNAM, B.A., M.B., C.M.
YARMOUTH, N. S.

F. L., 48. Fisherman, small farmer. A large fat man, weight 275 pounds. Has consulted me several times previously for failing sight. Family history: Father blind for years, result of chronic glaucoma. One sister blind from same cause, her physician not recognizing the trouble. One brother living in the U. S. A. blind presumably from same cause.

Refraction record:

Sept. 3, 1905. R. 5/200 with—13.00=20/120. L. 9/200 with—9.00=20/200.

Aug. 1, 1906. R. same. L. 7/200. with—9.00=20/200.

On June 19, 1909, he came to see me, saying that his glasses had quite gone back on him. He had noticed this directly after a severe fall backwards, which had almost rendered him unconscious. Examination showed dislocation of both lenses, the right upward, the left downward, with moderate dilation of pupils.

On the morning of July 4, 1909, he came to my house to tell me that his wife had noticed something strange in his left eye two days before. I found the left lens in the anterior chamber. We had no hospital at that time, so I

advised him to go to Boston, Mass., the next day, the earliest possible, for treatment. Next morning he began his work as usual, but very soon was taken with an intense pain in his left eye and seen by his regular physician, who found him nearly crazed by pain, pulse 36, temperature 98.6°, and the eyeball very hard. He was given morphin sulphat, gr. 1/4, hypodermically and when I saw him at his home in the country, two hours later, the pain was much easier and pulse was 56. I found the eyeball very hard T+3 at least, the lens pushed forward close against the cornea, its periphery covered by the iris which was "balooned" forward. Under cocain, in about half an hour, the iris dropped back and the margin of the lens was free, so I decided to attempt removal of the lens. I made a good upward section, practically at or just behind the corneoscleral junction and at once there was some escape of watery vitreous as was to be expected. I tried in various ways to remove the lens by pressure, loop spoon, hook, but every effort brought more vitreous. I finally got a hook engaged and thought the lens was coming, but it slipped off and dropped back into the vitreous. In view of the very acute glaucoma present, and influenced in part by the family history, I did a wide iridectomy, bandaged the eye and gave a gloomy prognosis. However, apart from some pain, everything went on nicely, and a month later a traumatic cataract was to be seen. Later on this began to be absorbed and there being no nucleus, complete absorption resulted by March 10, 1910. V.+7.00=20/70. On Sept. 14, 1911, he came to see me again, this time the right lens was in the anterior chamber, having been noticed the previous evening by his wife. Next morning, thru a section similar to the one made in the left eye, I was able to remove the lens, with only a trifling loss of vitreous. The after history was uneventful.

Vision Oct. 31, 1912. R.+8.00=20/30. L.+6.00=20/40.

I have seen the patient many times since. In June, 1917, vision was the same, and I often see him driving around, and he says there is no apparent change. August, 1920, Dr. S. W. Prowse, F.A.C.S., of Winnipeg, saw the patient and can vouch for results as given.

April 8, 1921, the man was found dead in a field near his home. I knew he was suffering from some cardiac lesion, but, of course, was not looking for his death so soon.

The points of interest to the writer were: 1 family history, 2 progressive myopia under observation years before the accident, 3 partial dislocation of both lenses, due to indirect violence, 4 further dislocation into anterior chamber, with interval of over two years, 5 operative result. There are certain features in the case I do not quite understand. What became of the lens capsule? Did I remove the lens in its capsule? This case was seen before we had a hospital here and both operations were done at the home of the patient some miles in the country.

SOCIETY PROCEEDINGS

Reports for this department should be sent at the earliest date practicable to Dr. Harry S. Gradle, 22 E. Washington St., Chicago, Illinois. These reports should present briefly the important scientific papers and discussions.

NETHERLANDS OPHTHALMOLOGICAL SOCIETY.

Fifty-fifth Meeting.

G. F. ROCHAT, in the chair.

Translated from the Tidschrift v. Geneeskunde, by E. E. Blaauw.

Angiomatosis and Exudative Retinitis.

H. J. MEYLING demonstrated a case of angiomatosis retinae of von Hippel, in a rather advanced stage. A second patient with the exudative retinitis of Coats showed clinically much similarity with the first one. Meyling agrees with Berg that even if these diseases can be distinguished in the beginning, in their further course clinically and pathologicoanatomically the differences disappear.

Lashes in Anterior Chamber.

A third patient is a young girl who was wounded with a steel writing pen 15 years ago. Directly afterward the points of the pen were extracted from the cornea with an eyelash, which these held clasped. After months, when the blood was resorbed from the anterior chamber, there could be seen two eyelashes in fibrin on the anterior lens capsule. They are still visible and show loss of their pigment and fibrillary decomposition, without the slightest irritation.

Tumor of Anterior Chamber.

W. P. C. ZEEMAN showed a stereophotograph of a mother-of-pearl-white epithelial tumor in the anterior chamber of a boy, where a year previous a fork had penetrated the cornea. After removal the tumor appeared to originate from implanted eyelashes. 2d. the sections of an eye, which was removed some weeks after a serious penetrating wound, and where in the scar tissue, which had formed from the cornea in the vitreous cavity, were visible the sections of an eyelash, surrounded by giant cells, between the lens and ciliary body.

Metastatic Sarcoma of the Eye.

G. TEN DOESSCHATE observed a patient with the above condition; and one who showed a similar tumor of the retina.

The first patient was a 47 years old woman, who was admitted because she saw badly with O. D. since some weeks. V. was $<1/60$, T. = 15 mm. O.S. had a T. = 20 mm. and normal V. O. D. showed detachment of the retina, with negative transillumination.

After some 5 months she returned with severe pains, which had lasted 6 days. There was secondary glaucoma, T. = +1, negative transillumination, fundus invisible. Patient was much emaciated and showed multiple bluish-black nodules in the skin. These tumors were not painful, grew rapidly and are little adhering with the surrounding. In both axillae there were glandular swellings, the liver was not painful, but a little hard. The patient had strong melanuria.

Three days after enucleation, the patient suddenly saw badly with O.S., 6/60. A retinal detachment was present, with a blackish tinted margin; transillumination negative. After 7 months she was readmitted on account of severe pains in the legs, for a week swollen feet and is very weak. Many dark nodules in the skin. Very frequent heart sounds. In the superior external quadrant of the fundus was a large circumscribed tumor visible, which covered the disc partially. V. = O, T. = n. Some weeks later she succumbed under symptoms of general poisoning.

In a tumor from the upper arm, markedly, pigmented zones alternate with places with only a few pigment cells. A connection between the distribution of the pigment and the blood-vessels cannot be determined. In the dark spots nearly all cells are filled with pigment. The tumor in O. D. penetrates the papilla and its lamina

cribrosa. Some pigment cells are found in the optic nerve and its sheaths. The tumor has a very striking resemblance to that of the arm. The tumor of O. S. has grown in the papilla and covers a third of it. Some pigment cells have penetrated the papilla; in and between the sheaths of the optic nerve a layer of pigment cells is present.

Ten Doesschate considers it most probable, that a primary melanosarcoma had formed in O. D. This has produced metastases in the entire body; and in the choroid of O. S. In favor of this are the similar texture of the different tumors, and the fact that the affection in the second eye could be followed with the ophthalmoscope from its beginning, after the removal of the first eye.

The second case was that of a 50 years old lady, who had a congenital pigmented nevus below the right mamma; which had begun to grow in 1914 and was then removed. It was shown to be a sarcoma. Three years later symptoms of iritis and glaucoma appear in O. S. An intraocular tumor was diagnosed. The evening before the expected removal the patient had an apoplectic attack and remained unconscious during some days. A brown tumor, behind the iris at the temporal side was seen. O. D. was found normal; V. = 5/5. In the neighborhood of the macula was a small flat, white and black speckled focus. The vision of O. D. afterwards became suddenly worse (2/60); vitreous opacities and multiple white and black foci were seen. Before death the tumor had proliferated thru the iris and pressed the posterior surface of the cornea. Vision O. S. = 1/300. Tension O. S. = ±1. Fundus invisible. It became harder and more painful; trephining did not help. In O. D. the vitreous opacities markedly increased. Metastases in the skin appeared.

The tumor in O. S. consists of a loose tissue of spindle, round and polygonal cells, with none or few pigment granules. Between these, pretty regularly, large round and oval cells, entirely filled with brown pigment. Only few vessels. O. D. shows 5 separate tumors; one large brown tumor in the macular region, the others at the equator. The large tumor posterior in the eye lies entirely in the retina. Both layers of the retina are separated by a blood mass, in which is dark tumor tissue. The center is tumor tissue, which has replaced the inner part of the retina, in which are numerous blood spaces covered with endothelium. The choroid seems entirely free from tumor tissue. The inner retinal surface is dotted with pigmented cells, or coagulations including pigmented cells. Also in vitreous and anterior chamber are pigmented cells. On the surface of the disc are cells with brown particles (= leucocytes, which have taken up pigment granules?). The equatorial tumors lie largely in the inner retinal layers. It seems as if they had originated by implantation.

The nevus below the mamma became sarcomatous and formed metastases in the brain, uvea O. S. and retina O. D. This is the first case of true retinal metastasis of a tumor from outside the bulb.

Conjunctival Secretion and Culture Experiments with Trachoma.

Miss J. M. Kooy looked specially for the Prowazek inclusions, which she demonstrated. They were found except in a few very old cicatricial trachomatous cases. Besides the changes in the cell she found free initial and elementary bodies. Five times she succeeded with cultures in which these formations were refound and wherewith she demonstrates that these inclusions are to be considered true organisms, and not simple cell products. She gives the results of an investigation of the resistance and different other particulars of the organisms, and demonstrates the different forms, which she considers to be developmental stages of the same organism. She also mentions the different forms in the clinical forms of trachoma.

Discussion.—De Klejn asked for the representation of the developmental cycle.

Miss Kooy saw many Prowazek bodies in the acute forms, but in older cases chiefly elementary bodies. She considers these latter very resistant. Extracellular forms she found chiefly among the non-Jewish trachoma patients. Probably the true Prowazek bodies are the most contagious. She believes that trachoma in apes is proven.

Pressure During Syringing of Lacrimal Canal.

G. F. ROCHAT mentions that epiphora can be present with a patent lacrimal canal. It is impossible to guess the pressure during syringing, as an Anel syringe is not perfect. The pressure can only be estimated with a manometer. The fine canula of the Anel is put in the inferior canaliculus; which is in contact thru a rubber tube with a glass vessel in which is fluid. This fluid column is raised gradually and the fluid is also given opportunity to escape; so that the moment is found when the first drop appears in the nose. Not the normal force, wherewith in normal circumstances the tears are driven into the nose is investigated; but the pressure necessary for syringing under the abnormal relations, which arise from the experiment (stretching of the canaliculus, uncertainty where the end of the canula lies).

However, the result was the same in all cases, where the condition of the lacrimal canal was normal. Water appears in the nose when the fluid column becomes 25 to 30 centimeters higher in the vessel. When one begins with a much higher pressure, as 60 cm. water, and reduces this column, then drops still come out the nose at a pressure of 15 cm. Once filled, the lacrimal canal seems to act as a siphon.

In these investigations a correction must be made for the resistance in the narrow canula of Anel. If the fluid escapes freely thru the canula a fluid column remains of about 8 cm., which is kept in equilibrium thru the resistance in the canula. This amount must therefore be deducted from the values found and the result is reached, that *the pressure necessary for syringing the normal lacrimal canal is about 17 to 22 cm.*

Now the pressure usually exercised was to be found. The Anel syringe with the fine canula was connected with the manometer, in which the level was gradually raised, while the piston, against the water pressure, was pressed inward. With a pressure of 60 cm. in the manometer the syringe did not produce a sensation of abnormal resistance. Hence a pressure is easily used with the syringe which is three times greater than necessary. Patients, who complained of epiphora, and where the rhinologist could not find any abnormality, were examined with the manometer and a higher than normal pressure was found; so that altho the syringing succeeds, still a narrowing of the passage could be demonstrated.

DISCUSSION.—De Klejn mentions the experience, that the West operation is not successful in the cases of epiphora, where the syringing with Anel succeeds. If it now appears, that in these cases there still was an obstacle, then the stenosis must be in the canaliculus.

Visser saw much benefit in such cases from slitting the canaliculus, which speaks in favor of this hypothesis.

Rochat was not yet able to examine with his method, the cases which had failed with the West operation. He has the same experience as Visser. Blok saw the same: with readaptation the epiphora reappeared, and stopped with reopening.

Wibaut asked if Rochat probed these less passable passages.

Rochat was friendly toward sondage.

Van der Hoeve mentions that success of slitting the canaliculus does not prove always, that this was strictured; it also helps with slight eversion. Reilingh advocates linear cauterization of the conjunctiva in eversion.

Myopia in Semidarkness.

F. WIBAUT mentioned the communication of Baraneck and Verrey in 1893, who had found that all eyes in the

dark have a refraction of ⅓ to ¼ D. stronger. This phenomenon remained under atropinisation, and could be found skiascopically and in the upright image. Charpentier mentioned in 1902, that myopes become more myopic in the dark. He found for himself 2 D., among others 0.5 to 1 D., sometimes even 3 D. These investigators concluded independently that the light produces a stronger filling of the choroidal vessels. The disappearance of this in dark produces recedence of the retina with consecutive myopia. Schoute in 1903 could not demonstrate this for himself.

Wibaut could prove it clearly for himself, but Prof. Zeeman could not find any difference of refraction in his atropinised right eye with maximal or minimal illumination and with dark and light adaptation.

Experimentally it was found that the refraction began to increase with an illumination of 0,66 meter candles, when V. was 6/18, and increased to 1,5 D. with an illumination of 0,11 m.c. with V. = 6/38 to 6/12. The impression arises that with the weakest illumination fixation is not strictly central. The phenomenon begins within the first minutes of dark adaptation, increasing during some minutes to remain constant with further dark adaptation; only during longer adaptation the observation is somewhat more difficult. The accommodation has no influence, also the larger pupil in dark does not explain.

The explanation is partly found in the phenomenon of Purkinje. This exists also for the fovea (Hering). If it is considered too small in the fovea for having an influence, it must be remembered that the myopia was the strongest with illumination, whereby the fixation was not more central, and here therefore the parafovea also functions. If the eye becomes more sensitive for the stronger refracting rays with these low illuminations, it will explain that this can change the refraction. Theoretically a difference of 2 D. can be computed between the refraction of the extreme red and extreme violet rays. Practically Wibaut could demonstrate for himself and others a difference of 0.75 to 1 D. His refraction is in daylight E.—0.25, with a red filter E.—0.25, with a green filter E.+0.25, with a blue filter E.+0.75. His usual refraction in daylight can therefore be called his "red refraction." Monochromatic light in the dark gave similar results, altho the myopia was only partly present. To explain this he refers to the investigations of Ogata and Weymouth (Amer. Jour. Oph., Sept., 1918): the deeper situation of the parafovea in some people.

Discussion.—Kröner asked if the dispersion circles with weak illumination, which can be observed, are perhaps smaller. Wibaut does not think this probable, because weak positive lenses disturb vision very much.

Rochat asked if the diminishing action of the negative lenses might make the images more illuminated and better observable. Wibaut computed this expected change in illumination and concluded that this stronger illumination does not produce improved vision, as is given by the negative lens.

Van der Hoeve suggested the improved sharpness of the image thru negative lenses, due to the simultaneous narrowing of the pupil.

Marx quoted Bjerrum, who ascribed this improvement of the image to the fact that the same quantity of light is concentrated on a smaller retinal surface.

Prevention of Loss of Vitreous.

J. van der Hoeve states that sometimes quite an amount of vitreous can be lost without damage. But on the other hand small disturbance can produce permanent damage, so that the ophthalmologists agree that it is good to disturb it the least possible and to prevent its loss.

In operations, where there is danger of this complication he proceeds thus: he puts 4 threads with fine needles thru the sclera without perforating this near the cornea at 90 degrees distance from each other. At the place where the bulbar incision is going to be made he puts a corneo-scleral thread without perforation. Two assistants take each two threads, of the 4. The bulb is opened in the limbus, between the two parts of the corneo-scleral thread, the

incision, if necessary is enlarged with scissors.

If, for instance, a luxated lens must be delivered, a hook or loop is introduced. If during this action the vitreous threatens to escape the assistants pull with equal force the threads outward and forward; which brings the bulbar wall outward and the pressure becomes negative. After finishing the operation the corneo-scleral suture is tied and the 4 assisant threads removed. Loss of vitreous can thus be prevented or reduced to a minimum.

This procedure can be helpful in all cases where loss of vitreous may be expected; removal of a luxated lenses from the anterior chamber or vitreous, of subluxated lens from the pupil; cutting away of secondary cataract; removal of the lens in its capsule; cataract removal, in eyes in which we know or can surmise with great confidence that the vitreous is fluid; operations in eyes without a lens, also for freeing an anterior synechia from the cornea. The corneo-scleral suture should not remain longer than 24 hours in situ.

Discussion. Tresling corroberated the good results and thinks that the location of the threads does not need to be so exact. By putting the threads more backward toward the ocular muscles he could make a bag-mouth suture in a case of lens luxation, and would not need the corneal suture.

Weve feared greater danger from infection thru aspiration, and objected to the many needed hands.

Van der Hoeve finds that the corneal suture hardly makes the incision more difficult. He fears from the more backward displacement of the threads an undesirable deforming of the bulb. The many hands do not disturb; the danger of aspiration can be prevented by careful removal of the fluid.

Zeeman believes much in the upper and lower threads, because after incision these scleral points will be in need of greater assistance than the temporal and nasal ends of the horizontal meridian; the procedure recommended for synechotomy, without the corneal suture, has given him good results; he likes the conjunctival flap prepared before the incision.

Van der Hoeve stated that this conjunctival flap is laid over the cornea and disturbs the sight. He also considers the upper and lower threads of the most value, which at the same time help in fixing the bulb.

Wilbaut mentioned that Bader has shown with tonometric measurements that the chances for vitreous loss in young people are greater than in old ones, and recommends the described method for all young cataract patients.

The Struggle of the Visual Fields.

C. Otto Roelofs stated, that if the two retinal images are so unequal, that they cannot be united to one single representation, they will be perceived mostly alternately, the so-called struggle of the fields.

In this struggle one of the retinal images can preponderate. The fact, that during the struggle the preponderating image disappears from time to time points to disturbances of the intensity, wherewith the retinal image is perceived. These must be pretty strong, as even images with sharp borders and strong contrasts disappear temporarily, even if the other eye looks at an even black field. These disturbances have for each eye an individual course. The physiologic process, which is at the bottom of it, is not in the retina; as the adaptation progresses regularly without being disturbed by the disappearance and appearance, and the phenomenon begins before the adaptation can have any significance. Indications exist, that the process must be localised high up in the central nervous system. In the beginning of an observation the interest for the observed object is the greatest, then gradually diminishes, while the multiplicity of the interest disturbances in the different parts of the visual field remains about the same. The interest diminishes strongly from the center towards the periphery, the multiplicity of the interest disturbances increases slightly toward the periphery.

Also some difference between right and left eye exists for the speaker.

The interest for the image of the left eye seems a little greater, the interest disturbances somewhat less in number. A difference between the nasal and temporal sides of the visual field was observed, which may be explained by greater interest for the nasal halve. A distinct difference was found between upper and lower visual halves. The number of interest disturbances was about alike, but the interest for the upper half, showed greater. This unsuspected result, which seemed some what dependent on the choice of objects, seems to be connected with differences in adaptation and light sense. Differences between right and left halves of the visual field, that is between right and left hemispheres, were not clearly present. Perhaps the multiplicity of the interest disturbances is somewhat larger for the right hemisphere.

The investigation has demonstrated, that for the observation of stimuli and contrasts well above the threshold value, interest disturbances exist. The attention itself is very changeable and dependent on many factors. The multiplicity of the interest disturbances is far more stable; and where differences could be demonstrated, they only were small. It will be interesting to investigate these interest disturbances also for the other senses and to compare them.

Color Sense in the Animal Kingdom and in Man.

H. WEVE read a paper on the subject, not abstracted here.

Distribution of Phlyctenules Along the Limbus.

E. MARX has observed a certain regularity. They appear preponderantly in the horizontal meridian. Marx has put down his cases for 1917 and 1918 around a dial. The temporal halves show more cases than the nasal ones: 89, and 91 for the temporal halves of O. D. and O. S., against 43 and 51 for the nasal sides of O. D. and O. S. In the upper quadrants the least number appear.

Anatomic reasons can not be found, and we must look for external reasons. The outside atmosphere cannot have an important influence, because in the tropics scrofulous ophthalmia is less frequent, which excludes the influence of illumination and desiccation. Comparison of the months in which the phlyctenules appeared the most showed the same number in February and July 1917 and January and June 1918. Perhaps dust can explain a little, as the temporo-inferior quadrant is the least protected.

ROYAL SOCIETY OF MEDICINE.

Sections of Neurology and Ophthalmology.

March 10 and 11, 1921.

PROFESSOR REYNOLDS and DR. JAMES TAYLOR, Chairmen.

Ocular Palsies.

DR. GORDON HOLMES, who opened the debate, devoted a good deal of attention to the question of the situation and nature of the lesion in various forms of paralysis or paresis of oculomotor nerves, and he had much to say about associated palsies. A matter of much interest was the "unwillingness" or reluctance of some patients with cerebellar disease to turn the eyes towards the side of the lesion in performing conjugate deviation.

Since he had been attached to the staff of Moorfields Eye Hospital he had seen many cases of ocular palsy, and in each of them he was conscious of a difficulty in deciding what the case was likely to be due to. Only by a careful weighing of the signs of associated disease could even a presumptive diagnosis be arrived at. With regard to such palsies occurring in association with Graves' disease, it was interesting and surprising that not very many years ago Hughlings Jackson and others regarded such palsies in this connection as very exceptional. Dr. Holmes, however, now saw a considerable number of cases in which the association existed. One had to regret, however, a paucity of histologic work in this relation.

With regard to so-called rheumatic

or toxic neuritis of oculomotor nerves, he had seen a number of these cases, and there was a frequent involvement of the external rectus, or of the muscles innervated by the third nerve, associated with pain in the forehead on the same side; sometimes there was considerable anesthesia. In some cases he had seen there was a septic focus in the neighborhood. In these cases Déjerine and others had found merely degenerative changes in some parts of the nerve. He did not find it easy to conceive of cold affecting ocular nerves in their intracranial course. He did not feel that these cases were rheumatic, nor purely toxic, because most toxic affections were bilateral, or at least more or less symmetric; whereas most of these palsies were unilateral. In the spinal cord, local collections of cerebro-spinal fluid formed and compressed the roots of the nerves, or the cord itself; and he thought loculated collections of cerebro-spinal fluid might form in the base of the brain and involve one of the oculomotor nerves.

Mr. Leslie Paton spoke of the complexity of the subject. For example, one disease alone—syphilis—was capable of producing an oculomotor paralysis in many different ways. It might affect any part of the oculomotor apparatus: cortical, supranuclear, nuclear, nerve roots, nerve trunks in their intracranial course, in the cavernous sinus, or in the orbit; or it might implicate the muscles themselves. A gumma might develop at any point. A syphilitic meningitis might affect the nerves. Syphilis, setting up disease of vessels, might cause hemorrhages affecting the nuclei or nerve roots. Or a syphilitic arteritis in the internal carotid might press on nerve trunks in the wall of the cavernous sinus, or an endarteritis might affect the vessels supplying the crura, the midbrain, or the pons, and cause areas of softening. Or syphilis might cause general paralysis, or tabes and hence the variety of ocular disturbances found in them. Yet probably not more than 40% of the cases of ophthalmoplegia were due to syphilis.

Oculomotor paralyses might be divided into *three main groups,* of which there were subgroups.

I. Paralyses of central or cerebral origin, comprising

(a) supranuclear lesions;
(b) intranuclear lesions;
(c) nuclear and nerve root lesions;

II. Paralyses of extracerebral origin, i. e., of nerve trunks, again comprising, as subgroups, (a) intracranial, (b) intraorbital.

III. Paralyses of muscular origin.

The arrangement and relations of the oculonuclei was, he said, the subject of much discussion, and no dogmatic opinion was possible at the present stage of knowledge. The important intranuclear set of fibres was, undoubtedly, the posterior longitudinal bundle, for it was by means of this that the various oculomotor nuclei were brought into connection with one another and with the vestibular and auditory functions, and with the general muscular, the sense and the other afferent impulses in the body.

The connections of the posterior longitudinal bundle are, he said, intricate, and had not been yet completely worked out. The most important nucleus of origin of these fibres lay in Dieter's nucleus. The control of the internal musculature of the eye was also a matter of considerable doubt and dispute. The vascular supply of the oculomotor nuclei was derived from the anterior end of the basilar artery. The vascular lesions affecting the pons, crura and this region gave rise to various interesting forms of crossed hemiplegia, the most important being known as "Weber's syndrome," "Benedict's syndrome," "Foville's syndrome," and the "Millard-Gubler syndrome."

Nuclear ophthalmoplegias, or ophthalmoplegias proper, could be subdivided into acute and chronic types. The acute included the toxic form caused by alcohol, Wernicke's acute polioencephalitis superior hemorrhagica being a good example. Good examples of the infective type were found in lethargic encephalitis, influenza, and syphilis. In a very definite proportion

of cases of acute ophthalmoplegia, however, no infective agent can be traced. Of chronic progressive ophthalmoplegia, the most important form was that occurring in tabes and general paralysis of the insane. There were, besides, certain ophthalmoplegias of congenital origin, and others were of a distinctly familial type.

Dr. Wilfred Harris thought cases of chronic nervous disease in which weakness of one internal rectus was noted on attempts at conjugate deviation, were not rare. He had seen a number. One was in a subject of disseminated sclerosis, who could not look upwards, tho other eye movements were intact; he had no nystagmus. Such cases were probably due to interruption of the fibres of the posterior longitudinal bundle. He spoke of cases of damage to the 6th nerve following injection of the Gasserian ganglion with alcohol. The patient was a difficult subject, in whom three attempts had to be made, and then suddenly a greater quantity of alcohol than was intended entered the locality. Recovery from the result of this accident always occurred in a few months. He asked whether his colleagues recognized a rheumatic neuritis of oculomotor nerves, branches of the 3rd or the 6th in the orbit. It had not been rare for him to see palsy in the external rectus with some pain in the orbit, and there might be some anesthesia. He did not think the teeth were at fault in all the cases, nor was a definite septic focus evident.

Dr. J. Gray Clegg, (Manchester), devoted attention to the occurrence of *ophthalmoplegia in Graves' disease.* Osler and McCrea regarded such occurrence in this disease as a complication, rather than as part of the main disease; but in his "Pathology of the Eye" Parsons said extrinsic ocular paralyses in this association were not uncommon. J. S. Bristowe had recorded a case in which ophthalmoplegia externa followed Graves' disease after an interval of three years, and in that case no disease of the nervous system was found *postmortem.* This and similar cases Hughlings Jackson regarded as remarkable. According to G. F. Suker, a new ocular muscle symptom was present in quite a number of cases of Graves' disease, which that observer designated as a deficient complementary fixation in lateral rotation. It was considered by him to be due to the same underlying conditions as those which produced the other ocular muscle symptoms, i. e., dissociation in the functions of the sympathetic and extraocular motor nerves of the eye. But it was rare for practically complete bilateral double ophthalmoplegia to occur in this association. Dr. Gray Clegg recorded in detail one such case in this contribution. Considerable recovery of ocular muscle power took place during the patient's convalescence from the general disease.

Dr. S. A. Kinnier Wilson limited his remarks to the question of the possible occurrence of unilateral *cranial polyneuritis.* He related the case of a man who had been in Palestine and Egypt, and in Cairo was very ill with pneumonia and pleurisy, and seemed to have a generalised pneumococcal infection. While his illness was at its height he developed complete paralysis of the 7th, 8th, 9th, 10th, 11th, and 12th cranial nerves, but only on the right side. Ordinary tests for nervous disease, and syphilis tests proved negative. He had a girl under his care who certainly had a rheumatic diathesis, and she had paralysis of the 5th, 6th and 7th nerves on one side only. A case was on record of an Italian engine driver who always stood on the right side of his engine, and had the wind and rain on that side of his face; he developed paralysis of the 3rd, 4th, 5th, 6th, 8th and 12th on the right side only.

Mr. N. Bishop Harman commented on the comparative rarity of cases such as were under discussion. He said that in a consecutive series of 5,000 patients he had found only 27 instances of ocular palsy. Males were more often affected than were females (males 17, female 10). Paresis due to injury headed the list of causes, with 7; syphilis caused 5, and general vascular disease or degeneration 5. Two cases due to exposure were arguable; but in one of them there were very definite manifestations of in-

flammation over the affected muscle, and both cases were rapidly cured. His cases did not warrant the view that life was shortened by the occurrence of these paralyses. With regard to treatment, he said he knew of no more satisfactory way of overcoming the diplopia than the wearing of spectacles of which one lens was of ground glass. And of local measures of treatment, blistering, massage, and faradism were effective when the lesion was peripheral.

Mr. Hines read a joint paper by himself and Mr. MacMullen on *chronic progressive ophthalmoplegia externa*. They said that in their text-book on "Neurology of the Eyes," Wilbrand and Saenger grouped as a clinical entity certain cases of external ophthalmoplegia, which they considered to have certain definite characteristics which separated them off from the congenital cases, as well as from those due to definite toxic causes, or to syphilis, or associated with some manifestations of wider spread disease of the nervous system. These cases Wilbrand and Saenger stated to have the following characteristics: 1. Onset gradual, usually in infancy or early life. 2. The ophthalmoplegia is bilateral and very slowly progressive. 3. There are no other signs of disorder of the nervous system, nor any affection of the general health. 4. The disease may come to a standstill, either permanently or for long periods, at any stage in its development, but generally ends in complete, or nearly complete external ophthalmoplegia. Mr. MacMullen and Mr. Hine showed to the Section two patients whose condition tallied with this description, and they had seen a third.

Mr. M. S. Mayou sent a short communication on the two cases of *paresis of the upward and downward movements* of the eyes. A man aged 46, while straining at stool, was seized with severe pain in the head, and giddiness. Afterwards he could scarcely walk owing to the diplopia and inability to look in a downward direction. The pupils were active to light. Convergence and lateral movements were normal. The vision was 6/12 in each eye, there was no optic neuritis, and the knee jerks were present. Wassermann reaction was negative. After rest, and the administration of iodid of potassium, the patient obtained full movement in the downward direction, but there remained some limitation of the movement of the eyes upward, and the attempt brought on a coarse nystagmus. Recovery was now practically complete. The second case was also a male, and his age was 42. He was suddenly seized with intense vertigo and diplopia, but no headache. The pupils were very sluggish; vision 6/6 in either eye. Outward and inward movements were free, but all power of convergence was abolished. Knee jerks were present, Wassermann test negative. He was put on iodid of potassium, and gradually recovered. The sudden onset suggested hemorrhage as a cause. Mr. Mayou said the position of the lesion had been variously stated to be the optic thalamus, the corpora quadrigemia, the pons, and some thought it was subcortical. None of those conjectures had been verified by *postmortem* examination.

Mr. J. H. Fisher, referring to the cases in which the *6th nerve* was accidentally damaged when injecting alcohol into the Gasserian ganglion, said he thought the damage did not occur actually in the floor of the cavernous sinus, but that the alcohol had stripped up the dura mater and involved the 6th nerve behind the sinus.

Dr. James Taylor expressed regret that *myasthenia gravis* had not loomed fairly large in the debate, as that was one of the common grounds on which the neurologist and the ophthalmologist met. Since he had been associated with Moorfields Eye Hospital he had seen many such cases, and he had been impressed by the great variability in their course, tho in many the progress was definitely downwards. On one day the patient would have almost complete command of ocular movements, and at another time he could scarcely carry out any ocular movements, nor effectively use his arm and hand muscles. He described one remarkable case which was in an advanced condition, in which the patient suddenly developed an intense desire to return to his home—some 80 miles distant—where he went, and was not heard of again un-

til he wrote asking for a certificate that he had been a sufferer from myasthenia, as he had been warned for military service. He was at the time following his occupation of carpenter.

H. DICKINSON.

THE OPHTHALMOLOGICAL SOCIETY OF NEW SOUTH WALES.

February 2, 1921.

DR. F. GUY ANTILL POCKLEY, President

Cyst Under the Lid.

DR. E. A. D'OMBRAIN showed a little girl aged 10 years with a swelling under the upper lid near the inner angle. She also had a purulent conjunctivitis. The condition had been present for a week but otherwise there was nothing abnormal in the child's history.

DISCUSSION. Dr. Halliday believed it was a cyst and should be removed by operation; while Dr. Kelly was of opinion that it was probably an infected cyst.

Entropion of Infants.

DR. J. C. HALLIDAY showed two cases of entropion in children.

On one child 10 months of age he had operated by means of Snellen's sutures, and the condition was much better. The other child was only 5 months old, and he had done nothing beyond advising massage of the lid. The mother reported that another little girl had had a similar condition as a baby but had recovered.

DISCUSSION. Dr. Kelly said that he thought they were cases of spasmodic entropion. Dr. Guy Pockley considered the second case due to epicanthus. Dr. D'Ombrain had seen two or three cases in little children, and a good result was obtained by pushing the lower lid in with the fingers. Another case wore spectacle frames without glasses; the contact of the lower edge of the rims kept the lid in proper position until the eye recovered.

Angioma of Lid.

A third case shown by Dr. Halliday was a congenital angioma of the eye lids with conjunctivitis, in a child which was seen two weeks after birth. He had tied off some of the growth, and was applying electrolysis. There were obviously still blood vessels in the lids. The meeting expressed a wish that Dr. Halliday should further report on this case.

Traumatic Cyst of Iris.

DR. GUY ANTILL POCKLEY showed a case of a boy about 7 or 8 years of age. Two and a half years ago the boy was playing with some wire, when it broke, and the end springing back, hit him in the eye, causing a perforating wound in the cornea and the iris. A traumatic cataract had resulted, for which he had done a needling.

He did not see the child again until today when he noticed that on the margin of the laceration of the iris there was a small elevated patch of brown pigment, about a couple of millimeters in diameter, which appeared to be in the structure of the iris, and in his opinion split it into two layers. It had new vessels running into it, and there was a slight blush on the temporal side of the cornea, indicating an inflammatory condition.

It struck him as highly probable that it was a small implantation cyst in the iris, and thought it might be interesting to show, after seeing the large cyst which Dr. Halliday had shown at the last meeting in a case which gave a somewhat similar history. He proposed to keep it under observation, and if there should be any sign of increase in the mass, he would do a small iridectomy and remove it.

DISCUSSION. Dr. Kelly thought that the discoloration was due to pigment from the posterior surface of the iris; Dr. D'Ombrain also held this view.

Dr. Halliday reported that he had operated on the little girl shown at the last meeting. She had a cyst at the periphery of the iris following a perforating wound. He attempted to remove the cyst but it collapsed and he had to enucleate the eye. If he should have another case he would do a small iridectomy and try to remove the cyst from the cut edge of the iris.

J. J. KELLY, Secretary.

THE PUGET SOUND ACADEMY OF OPHTHALMOLOGY.

Meeting of February, 1921.

Release of Iritic Adhesions by Suction Massage.

DR. H. V. WÜRDEMANN read a paper on this subject published in this Journal p. 446.

DISCUSSION. Dr. Hoffman thought massage of the eye contraindicated if inflammatory symptoms are still present as the condition might be aggravated, with formation of fresh exudate. A recurrence of acute iritis would more than offset the good done by breaking up adhesions.

Dr. Wanamaker thought massage, if not severe, might be beneficial even in an inflamed eye on account of the hyperemia secured, as in hot applications.

Dr. Swift thought there would be considerable danger of hemorrhage in the manipulation especially in elderly people.

Dr. Mattice emphasized the importance of blood pressure measurements and examination of the fundus for arteriosclerosis before massage, also danger of detachment of the retina in myopia. In elderly people with weak zonulae the lens could easily be dislocated. In selected cases where inflammation has sufficiently subsided there would be little risk in suction massage. He had seen Dr. Würdemann treat a case of optic atrophy in which marked improvement of fields and vision had been secured. The immediate result of a treatment is intense hyperemia of the retina and nerve head.

Dr. Würdemann in closing said: criticism of this procedure may be made, that it is radical and might cause damage to the eye from intraocular hemorrhage. Such is indeed true, but if used with discernment, none need arise. The principal object of treatment in iritis, aside from relief of pain and removal of its causes, is to prevent filling up of the pupil. Atropin is used mainly for dilatation and where it fails in recent cases the synechiae are broken away by the massage. Pathology of synechiae shows that at first the adhesive bands are exudative, later becoming organized into elastic tissue, which cannot be rended by mechanical means except by instrumental cutting of the bands, which, in many cases would also tear the anterior capsule of the lens, causing cataract, and hence such operations are not to be recommended.

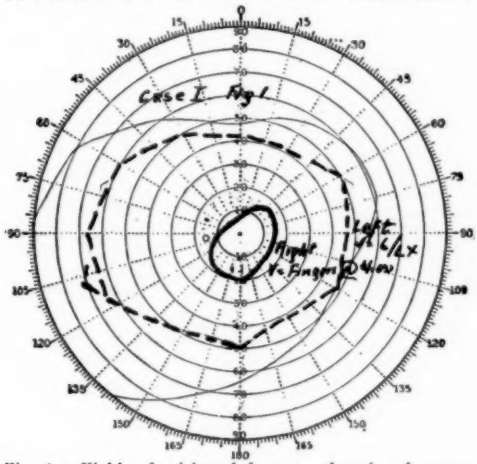

Fig. 1.—Field of vision left eye, chronic glaucoma with acute exacerbation.

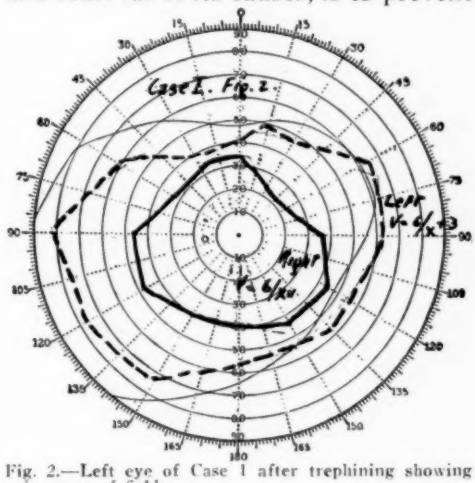

Fig. 2.—Left eye of Case 1 after trephining showing increase of fields.

Chronic Glaucoma with Acute Exacerbation.

DR. H. V. WÜRDEMANN reported the following: CASE 1. a merchant, age, 63. History: Reduced vision, especially in right eye. Wearing glasses for last 30 years, from opticians; remeasured about three months ago. At

times for the last three years the right eye has become inflamed and sight failed with each attack. Sees rainbows. Reads very much. Very high liver. Eats much meat, pastry, excessive coffee, wines, etc. Short, thickset man. Superficial circulation plainly seen in face. Blood pressure, 210-125; heart, normal except for accentuated second sound; Wassermann, negative; urine, negative except for hyperacidity.

Eyes: Vision, R. fingers at 4 meters; L. 6/60. With right and left +2.50, vision equals 6/24 and 6/6.

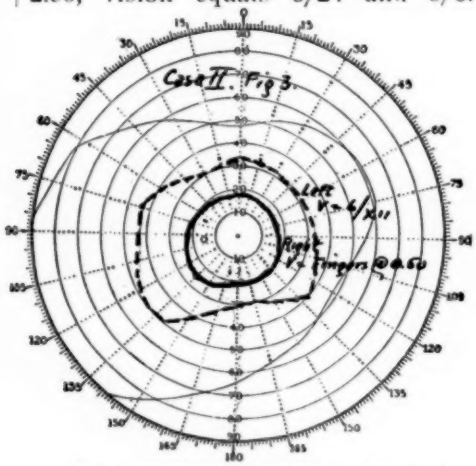

Fig. 3.—Field of vision left eye Case 2.

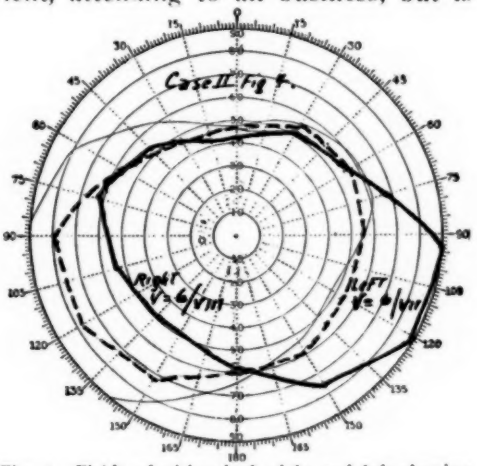

Fig 4.—Fields of vision both right and left showing recovery Case 2.

Visual field, right, constricted to a small circle under 10 degrees, nasal, and under 20 in other directions. Left visual field slightly constricted. Tension R. T.+3. L. T. plus. Glaucoma discs both eyes; angiosclerotic vessels. Quite exhausted at time of examination. No mydriatic was used. Came in the next day with an acute glaucoma in the left or better eye. Sent immediately to Swedish Hospital, where two pounds of blood were removed from arm by venesection. Eserin hot compresses; purgatives.

November 26, 1920, double Elliot trephining with iridectomies under ether, with stitches. Progress very good; stitches removed in office, December 1, 1920. Glasses prescribed December 27, 1920, right and left, +3.00 and add +3.00. Vision, right, 6/60; left, 6/12. Blood pressure, 180-100. At subsequent examination blood pressure 190-95. Diet materially reduced. Sodium iodid, internally, pilocarpin, locally.

February 8, 1921. With correcting lenses vision, right, 6/12; left 6/10+3. Visual field, right, increased to practically 40 degrees; left normal. No haloes except when looking sideways at light, but occasionally sees colors. Tension, right and left, minus one. Large bleb over trephining hole, right. Left can be produced by rubbing conjunctiva. General conditions excellent, attending to all business, but is keeping on strict diet. Fundus shows glaucoma cups more marked in right eye. Case reported to show unusual restoration of vision in almost blind right eye, and for the beneficial effects of the operation and general treatment.

Case 2. M. age, 64, dishwasher in restaurant. Right eye sore for one week; cannot see, haloes. 3/29/20. Short, well-fed man; blood pressure, 160-85. Vision, right, counts fingers at 50 c. m.; left, 6/12. Greatly contracted visual fields, the right a circle down to 20° and the left betwen 40° and 30°. Cupping of optic discs. Tension both eyes. Right congested anterior chambers shallow. Prescribed pilocarpin and Rochelle salts and diet. April 6, 1920, double Elliot operation with iridectomy, rather difficult, done under local anesthetic, hyoscin grain 1/100 and morphin grain 1/4. Patient very nerv-

ous and small amount of chloroform given by anesthetist. Uneventful recovery; stitches removed in office on the sixteenth. Glasses prescribed June 10, 1920. With right and left +.50, add +3.00, vision equal to 6/8 minus 2, right; 6/7½, left. Patient seen a number of times afterwards and vision remained good. Visual fields increased. Case also reported to show exceptional recovery. 2-14-21. V. F. full size both eyes. V. R. 6/viii, L. 6/75.

Glaucoma Following Traumatic Iritis Detachment of Retina.

Mr. W. C. Age, 41; birthplace, Germany. History: Blind in left eye for two years, following an injury of the head in a train wreck 2½ years ago. Eye tender to touch; inflamed from time to time with shooting pains. Examined 8/9/20. Vision, right, 6/6; left, blind. Heavy-set woman in apparently good health; blood pressure, 140-85. Many capped teeth, several abscessed, which were later removed. Iritis left eye with total detachment of retina; tension minus. Enlarged tonsils, not inflamed. Treated with sodium salicylat, internally; diet; atropin; dionin and high frequency heat electrodes, at times of office examinations. September 10, 1920, eye quiet. September 30, 1920, tonsillectomy under general anesthesia at hospital. November 2, 1920, came back with coryza; left pupil dilated ad maximum; tension plus three. Typical acute glaucoma. December 2, 1920, transillumination negative, and this has been used a number of times; tension plus three. Eye inflamed; great pain. Continued local treatment with aspirin, sodium phosphat, until January 4, 1921. Patient sent to Swedish Hospital, Elliot trephining with slight loss of vitreous, with root of iris removed; local anesthetic, grain 1/100 hyoscin, grain 1/4 morphin. Wassermann, negative; urine, negative. Operation has completely relieved the symptoms, but there is yet tension in the eye. The pupil is widely dilated; the prolapsed retina is readily seen by direct examination and oblique illumination, as well as with the ophthalmoscope. The transillumination absolutely negative. Case kept under examination and advisement on account of possibility of intraocular tumor. History reported to show relief from symptoms by operation, as well as the very unusual establishment of glaucoma in an eye that has had detachment of the retina.

Cataract Operation, Followed by Iridocyclitis, Hyalitis, Blindness.

Mrs. G. J. S., Bend, Oregon. Examination, July 30, 1910. Perinuclear brown cataract both eyes. Vision, right, counts fingers at 4 m.; left, fingers at 3 m. Seen a number of times until September 17, 1918, when I did a normal expression of lens in capsule, at Swedish hospital. Lens was a tumbler. Patient a thin, wiry woman with nervous temperament. General physical examination normal, except for acid urine. Normal healing. Vision equal to 6/20 with +9.00 combined with +7.00, 165°, add +3.00. Vision equal to ordinary print. September 7, 1920, at Swedish hospital, expression in capsule, capsule ruptured. First dressing showed debris in anterior chamber, no reaction, but there was a veil in the pupillary area when she returned home about six weeks later, with advice to return in 30 days or so for discission of capsule. Came back November 29, 1920, with eye inflamed, left pupil filled with yellowish membrane and iridocyclitis. At this time X-ray of teeth showed two lower left molars and lower right first molar abscessed. Teeth extracted. Vision, left eye, December 17, 1920, equal to shadows, tension minus, eye quiet. Had been given salicylates in moderate doses. About the first of January, she went to Spokane, with a card to Dr. Veasey, in case anything happened. Returned from Spokane on January 27th, with letter from Dr. Veasey, stating that the right eye had become hazy a few days before. No view of the fundus could be obtained and case has progressed until there is practically blindness in the right eye. Tension is greatly lowered. Gave sodium salicylat, atropin and dionin. It is probable that the infection of the left eye

was endogenous from the apical abscesses of the teeth and it is probable that the removal of these teeth opened up the blood vessels, permitting the infection to get into the general circulation and then into the right eye. It is comparatively often noted that in cases of rheumatism, where teeth are removed, an acute attack of rheumatism supervenes after the operation, despite the fact that the removal of the teeth, in some cases, removes the infection from the system and produces an immediate cure and a similar event is believed to have taken place in this case.

Tumor of Optic Nerve.

Dr. G. W. Swift reported the case of Miss N. W., age 16, who noticed shortly before Christmas, 1920, that she could not see with the right eye. Gradually it became slightly prominent. She has consulted several oculists in regard to her condition. There is nothing in her past history of importance except influenza one year ago. A well nourished young girl, fully developed physically. Left eye vision is 20/15. Pupillary reactions, media clear, optic nerve and retinal vessels normal. Right eye vision nil.

The eyeball shows a marked degree of exophthalmos, no paralysis of the ocular muscles elicited, the cornea is clear, the anterior chamber is of normal depth, pupil 4 mm., does not react to light, the media are clear. The optic nerve shows a marked edema with the vessels greatly congested, veins about the size of the arteries and seem to be elevated to 4 diopters, no areas of degeneration in the retina. Auscultation over the temporal region negative, pressure on the eyeball changes the caliber of the vessel slightly, but pressure on the carotid has no effect.

The diagnosis in this case is made by exclusion. A stereo X-ray, and also X-rays of the sinuses, reveal no bony changes or evidence of pus. Her Wassermann is negative, blood count is normal, temperature is normal. From these findings one would exclude a cavernous sinus thrombus; a sphenoidal sinuitis; ethmoidal sinuitis, maxillary sinuitis. There remains the possibility of a neuroma of the optic nerve, which is the diagnosis in this case.

I have suggested to the parents the possibility of removal of the neuroma, either by a tenotomy and attempting to remove the nerve clot or by a Kroenlein operation. I present this case for suggestions as to diagnosis and treatment.

Discussion. Dr. Würdemann agrees with Dr. Swifts' diagnosis and method of procedure.

Dr. Mattice said he had seen a small neuroma of the optic nerve removed by tenotomy and partial dislocation of the eye ball without a Kroenlein.

Dr. Bell said he had seen this case September 25, 1920. Pupillary reaction normal. Anterior chamber normal in depth. Tension of both eyes normal. Vision R. fingers at 2 feet. L. 20/20. R. disc margins normal. Vessels extend 4 D. into vitreous before passing to retina, whitest streaks about superior vessels. No elevation of disc. Arteries and veins both enlarged, slight exophthalmos. No up or down, right or left displacement. History: Reduced vision 4 weeks ago with headache at back of nose—accompanying transilluminate showed shadow over O.D.

Sclerosing Keratitis.

Dr. W. G. Cameron reported the case of Miss F. B., a telegraph operator, age 25, who in appearance was in the best of health. On November 19, 1920 she came to see me giving the following history: About two weeks ago she noticed a slight blurring of vision with her right eye. This gradually increased and the eye became painful in bright light.

Examination showed vision right eye 6/60; left eye 6/6. In the lower outer quadrant of right cornea is a small area of diffuse infiltration. The bulbar conjunctiva in this region is injected. The iris has a tag attached to lens which stretches out when eye is

dilated. Slight cloudiness of vitreous. Fundus normal in appearance.

She has enjoyed good health all her life and has had no disease except those of childhood. Has had no previous eye trouble. Her family are free from any of the diseases regarded as hereditary and give no history of eye disease. She was sent to a hospital and placed under the care of a general physician, where she still remains.

Her physical examination is negative, lens, heart, and digestive apparatus being normal. Urinalysis negative. Three Wassermann negative. Tuberculin test negative. Transillumination of sinuses negative. Tonsils showed very slight evidence of disease but were enucleated January 11. Had two X-ray pictures of teeth which were reported normal. Another X-ray of teeth is to be taken today and she has consented to have three suspicious teeth extracted.

Since I first saw her three months ago her eye has steadily grown worse. The infiltration has spread from a small area until it occupies the entire lower outer quadrant. At first the infiltration was some what diffuse but it has gradually become more dense until now it has become quite opaque and has the characteristic porcelain appearance of sclerosis. She has been quite free from pain except photophobia, at times the eye clears up for a few days and she is quite comfortable, only to be followed by an exacerbation of the symptoms.

She can still see 6/60 thru the clear part of her cornea tho not so clearly as when I first saw her.

Dr. Würdemann agreed with the diagnosis of sclerosing keratitis, stating that it is characterized by the porcelain appearance of the opacity. He called attention to the pathology in that it was smiliar to keloid of the skin, being composed of dense fibroid tissue.

Dr. Swift had seen good results from treatment with high frequency electric current.

Dr. Mattice suggested use of radium, as the pathology of sclerosing keratitis is very similar to skin keloid which yields to radium.

Iridectomy for Glaucoma.

Dr. A. F. Mattice showed a man 72 years old on whose right eye a glaucoma iridectomy had been done 6 months previously. Vision at time of operation 20/50, tension, (McLean tonometer), 70. Vision now 20/50 plus 2, tension normal. On account of lens opacities present at time of operation an iridectomy was done in preference to a trephining or other operation involving the upper scleral segment in order to leave the field clear for a future extraction. In this case and several similar ones tension had been permanently relieved by iridectomy alone and Dr. Mattice believes iridectomy should always be first tried when extraction is also to be considered. If a second glaucoma operation should prove necessary it could be done at another point on the limbus.

Discussion. Dr. Swift did not agree with Dr. Mattice. He considers glaucoma iridectomy a dangerous operation on account of possible hemorrhage and injury to the lens and prefers to do a trephining at the upper limbus, as he is able to place his cataract incision above or below the trephine opening without complications.

Dr. Bell said that a trephining at any other point than the upper limbus would be more dangerous on account of increased liability to infection.

Dr. Würdemann referred to Casey A. Wood's remark that "not every case of glaucoma requiring operation is best and most certainly relieved or cured by some particular method." Many cases of hypertension were best relieved by constant use of miotics. Of operations, the Elliot trephining, when done upward with a thick flap, is the safest. The Lagrange operation is the most difficult causing the greatest operative trauma but is preferred by some operators as a routine. Iridectomy has been used since the days of von Graefe with occasional cures, perhaps most of them cases with incarceration of iris in the wound, thereby establishing a filtrating cicatrix, which is the object of most operative procedures. Warning was given of the danger of hemorrhagic glaucoma and

detachment of the choroid and retina, from sudden release of intraocular tension, such as occurs in iridectomy.

ALBERT F. MATTICE,
Secretary.

SECTION ON OPHTHALMOLOGY, COLLEGE OF PHYSICIANS OF PHILADELPHIA.

January 18, 1921.

DR. G. ORAM RING, Chairman.

Disk-Like Congential Cataract.

DR. WM. ZENTMAYER presented a boy, aged twelve years. The vision had been poor since birth. There was no history of trauma or tetany. Patient's grandfather, father, an aunt, an uncle and two paternal cousins had congenital cataracts.

The examination showed cornea clear and A. C. normal. In the R. E. there was an irregular disk-shaped, chalky-white area in the lens surrounded by a grayish zone. Beyond this the margin of the lens was plainly visible as a highly refractile line appearing like a fine silver wire. The zonule could be plainly seen. No details of the fundus could be made out. The L. E. was as R. E. except that the disk-shaped opacity was smaller. According to Collins and Mayou in disk-like cataract microscopically, the lens is flattened anteroposteriorly so that there are two lateral masses connected by a band. In the central flattened portions of the lens a laminated mass of tissue is situated similarly to that met with in anterior polar cataract; it extends from capsule to capsule. In the rounded portion there is lens substance showing a varied amount of disturbance of distribution in the vicinity of the central portion becoming more regular and normal toward the periphery. Failure of development of the nucleus is probably the cause of the cataract. The cells of the posterior layer of the lens vesicle fail to lengthen out into lens fibers. The activity of the cells lining the anterior and lateral portions of the lens capsule is unaffected. The laminated mass in the center is probably produced in the same way as an anterior polar cataract, i. e., by proliferation of the anterior cells, as the outcome of low intracapsular tension in their vicinity. In these lenses where the nucleus fails to develop there would be abnormal low intracapsular pressure in the neighborhood of the anterior pole of the lens, hence the formation of an anterior polar cataract. The activity of the cells lining the sides not being interfered with, lateral lens fibers develop. Having no nucleus around which to group themselves they form accumulations of fibers at the sides of the anteroposterior mass, with irregularities and vacuolations of varying distributions.

Tendon Transplantation for Paralysis of External Rectus.

DR. LUTHER C. PETER presented a case of paresis of the external rectus in which he practised tendon transplantation by the O'Connor method. The patient was a woman, aged fifty-two years, who developed a convergent squint in late childhood. The left eye was turned in 30 degrees and could not be rotated temporalward more than to the center. Vision was much reduced by an old choroiditis. By the O'Connor method a conjunctival incision was made about 1 cm. from the cornea, extending from the insertion of the superior to that of the inferior rectus. The superior and inferior tendons were split backwards for about 9 mm., the outer halves severed from their attachments to the sclera and a double arm No. 1 silk suture was introduced in each from within out. The external rectus was split into three strands. The superior and inferior strands were cut vertically about 10 mm., from the attachment and were turned forward and united respectively with the superior and inferior transplants already prepared. The internus was completely tenotomized and the external rectus was advanced by a Lancaster whip-stitch, the middle third of the tendon being included in the tuck.

Recovery was uneventful and the patient now has external rotation of 50 degrees and internal rotation of 40 degrees. Upward and downward move-

ments are full. Inability to converge, altho there is good internal rotation, is probably due to the fact that the vertical recti are now stronger in abduction than in adduction and a perfect innervational balance for convergence is not yet established.

With a view to the improving of the technic the author suggests that the external rectus should be advanced and attached to the stump of the tendon. The overlapping tendon should then be split in half, turned up and down toward the recti transplants and attached. In this change the nutrition of the tendon will probably be better preserved and tendon will be attached to tendon with less chance of the stitches cutting thru. The external rectus tendon is very short, about 4 mm. in length, and the sections by the O'Connor method must include too much of the muscle, with more or less danger of the stitches cutting thru the delicate muscle strands, which are turned forward. Complete or partial tenotomy of the internal rectus must necessarily depend upon the degree of the temporalward rotation.

Injury to the Eyeball.

Dr. Walter L. Pyle presented five cases of ocular injury.

The first patient suffered a penetrating wound of the cornea by a piece of broken glass. The removal was followed by the complete collapse of the anterior chamber. Under the usual first aid treatment there was a complete recovery of the vision and within a few months every evidence of the previous corneal wound had disappeared.

While hunting, a well preserved man, aged forty-five years, received full in the face the charge of a shotgun. Numerous small shot were imbedded in the face and eyelids. There resulted a slight entropion of the lower right eyelid. A large vitreous hemorrhage cleared in a few weeks and there was complete recovery of the vision. At present the most troublesome sequel is the necessity of occasional epilation of aberrant cilia from the area of the entropion.

A nervous boy, aged fourteen years, was shot in the eye with an air-rifle, at about two hundred feet distance. A noticeable feature in this case was the profound shock that followed the injury. When first seen the patient showed a penetrating wound of the left upper eyelid, several contusions of the eyeball and dense hyphemia with blood streaked vitreous. One year later all the objective symptoms had disappeared and corrected visual acuity had increased to 6/12.

A sturdy boy, aged fourteen years, was shot in the eye with B.B. shot from an air-rifle at short range. There was a marked contusion of the eyeball and eyelid and severe subconjunctival hemorrhages. Among the sequelæ of the injury was a traumatic cataract, which under local treatment, including the application of powdered dionin, cleared in two small apertures thru which the application of a strong convex lens + S. 10.00 D. afforded vision of 6/12.

While grinding a tool, a machinist, aged twenty-eight years, was struck in the right eye with a fragment from an emery wheel. The injury was followed by a traumatic cataract, gradually reducing the vision to light perception only.

Under full mydriasis a small V-shaped foreign body could be seen, apparently attached to or near to the lower central margin of the iris. The interesting feature of this case was the negative X-ray report. It stated that there was no foreign body in the eye, but inasmuch as it could be seen both by direct and oblique illumination another study was requested. A second report stated that the foreign body was so small that in doing the Sweet localization they were not able to see the shadow in the lateral angle plate to determine the position of the foreign body to the right or left of the median line, but were able to determine definitely that it was in the anterior chamber beneath the cornea.

Dr. Shumway said in connection with Dr. Pyle's second case that he had recently seen a patient who had been struck in the face and chest by a

load of bird-shot. One shot had penetrated the lower lid and lodged beneath the conjunctiva of the eyeball, causing contusion of the globe and a localized vitreous hemorrhage, but the eye showed no perforating foreign body.

Dr. William M. Sweet said the failure of the X-rays to locate a piece of emery in the anterior chamber was not to the discredit of the apparatus or the operator, even tho the particle could be plainly seen by study of the eye. Emery like other similar mineral substances, offers only a moderate resistance to the passage of the rays and therefore there is not seen on the plate the same dense shadow that is made by steel. Even small metallic foreign bodies in the anterior portion of the globe are often difficult to locate, owing to the shadow of the body being lost in the shadow of the dense bone of the external orbital margin.

Concretions in the Lacrimal Canaliculus.

Dr. Edward A. Shumway reported two cases of concretions in the lacrimal canaliculus, both in women, one in the lower and one in the upper lid. Epiphora with purulent discharge had existed in each case for a number of months, causing catarrh of the conjunctiva, which disappeared at once on removal of the concretion and curetting of the canaliculus. In one patient the infection had burrowed beneath the conjunctiva, producing a cavity which had a posterior fistulous opening 5 mm. back of the punctum on the conjunctival surface of the lower lid. In this case cultures showed the presence of a long thread like organism, so that it was supposed that a streptothrix was present. Further examination showed the organism to be a bacillus in chains, with spore formation, which was contaminated by two other bacilli. Animal inoculation on the conjunctiva was not successful. Dr. Shumway discussed the pathology of lacrimal concretions and said that the concensus of opinion showed that usually the organism found was a streptothrix and that in a number of cases actinomyces was found, which was classed by most observers as a streptothrix; in one case a leptothrix had apparently been proved. Dr. Shumway called attention to the appearance of one of the illustrations accompanying the report of a case of Dalens, which showed long threads made up of bacilli in chains exactly like the organism found in the present case. This would apparently exclude it from the streptothrix class.

Ring Opacity of the Vitreous.

Dr. L. Waller Deichler, reported the following case: Mrs. M. H. presented herself for examination January 5, 1921, because of poor sight in the right eye. She had had the usual diseases of childhood: "spinal rheumatism" six years ago, ill eighteen months; exacerbations at irregular periods since, but none as severe as primary attack; fell from a bench at eighteen years and injured the left side, but no head injury or eye symptoms noted. About five years ago accidentally discovered she could not see well with the right eye. The condition has persisted ever since, without change, but she has never had any treatment.

Vision: O. D. — 15/200; O. S. — 15/10. External appearance negative, cornea clear; anterior chamber normal in both eyes. Pupils are equal and respond promptly to light and accommodation. O. D.: Vitreous haze permitting but limited view of fundus. Tension normal. O. S.: Media clear; disc well defined and oval at 90 degrees; fundus normal; tension normal.

Both pupils were evenly and fully dilated with homatropin. O. D.: Faint haze of vitreous, permitting, however, a good view of the fundus. Large ring-shaped opacity, oval and slightly flattened above, situated in about two-thirds the depth of the vitreous chamber, in front of and somewhat to the nasal side of the disc, about the size and shape of a cross-section of the lens, everywhere free except for a fine convoluted strand connecting its temporal edge and acting as a guy-rope, so that while this opacity floats around it is kept in the same relative position. View thru this ring is unobstructed, as is view around it. Disc is well de-

fined, oval at 105 degrees. Fundus is everywhere negative except for a small, irregularly oval area just below and to the temporal side of the macula lutea. This has well defined margins and consists of choroidal and retinal change with atrophic change and pigment collection. O. S.: Negative. Field for O. D. gives an absolute scotoma corresponding with the area of fundus change.

Dr. Zentmayer said that he had the records of four cases of annular opacities in the vitreous. They were all similar to the one presented by Dr. Deichler and occurred in the course of a uveitis. They were situated in the anterior part of the vitreous and had a diameter of about that of the orbicularis ciliaris. A possible explanation is that they represent a cast of the ciliary processes.

Dr. Burton Chance stated that he does not believe such ring-shaped opacities as are present in Dr. Deichler's case are unique, altho they are not common. He recalls two cases in his private practice, each of which was accompanied by more or less general uveitis. In the one there was a definite history of traumatism and cataract developed a number of years after, and the other was that of a woman who had a low-grade chronic inflammation.

Pseudo Foreign Body of Globe.

Dr. H. G. Goldberg reported a case of exudative choroditis resembling an intraocular foreign body, and presented the patient.

The man had been struck in the eye by a fragment of steel, which had been removed, leaving after it a small wound which suggested the possibility of the entrance of another F. B. He had been seen by several others all of whom concurred in the belief that the pigmented area in the fundus was a foreign substance. The patient was operated upon, unsuccessfully of course, and it was not until after this result that a correct diagnosis was made. Following the operation he recovered normal vision.

J. Milton Griscom, M.D.
Clerk.

BUFFALO OPHTHALMIC CLUB

February, 1921.

Epidermal Graft of Lid.

Dr. L. M. Francis presented two cases of epidermal graft of the lid.

Hyaloid Remains.

Dr. F. Park Lewis presented a boy with the question whether the pigment band extending from the disc and attaching immediately back of the capsule of the crystalline lens was a vestigial hyaloid or whether it was a definite tubular opening extending thru the vitreous.

Discussion. Dr. E. E. Blaauw. I do not think it is pigment. But it is no rarity to see a dark persistent hyaloid artery, and it is not rare to find in the fundus a great many small-chorio-retinal changes. Dr. DeBeck in 1890 wrote about congenital anomalies in the vitreous. I remember well seeing two or three pictures of the opening at the lens, and one of a very oblong opening in the macular region.

Hole at the Macula.

Dr. Cowper showed a typical case of hole in the macula following injury, with detachment of the retina.

Ring Abscess.

Dr. A. C. Snell reported a case of this disease, (see this Journal, p. 419).

Discussion. Dr. L. M. Francis: It might be interesting to recall the observations made by Gauden Wells. He said that keratomalacia is very common among these children, and many of them get well upon the use of cod liver oil. The condition was described by Sidney Stephenson as keratomalacia.

Dr. A. E. Bennett. A few years ago I was called upon the treat a case of ring ulcer that corresponded very much to the description given. At the time I first saw it, it encircled about two-thirds of the cornea. The patient was a paralytic. With the use of carbolic acid, one end would get well and the other end would continue to extend; but by repeated cauterizing I obtained healing.

Swelling of Optic Disc.

Dr. A. E. Bennett reported a case occurring in an alcoholic. He rapidly grew delirious and it was suspected that he had taken wood alcohol. Ophthalmoscopic examination showed both discs swollen four or five D. His reflexes were exaggerated. The pupils reacted to light. A spinal puncture was done, and two ounces of fluid were drawn under extreme pressure; that night he slept; and under tappings repeated each day the discs rapidly came down to normal and his vision improved.

Injury by Explosion.

Dr. F. Park Lewis reported a case of explosion in a bonfire. The patient was seen some eight or ten hours after the explosion. An X-ray was taken which was reported as negative. The cornea in the left eye was torn, there was a hole thru the iris on the nasal side, also a hole thru the lens, all indicating a foreign body in the left eye. The right eye was swollen shut but apparently without involvment of the cornea. Another X-ray was ordered. The interesting feature was the difficulty in fixing the eyes in taking an X-ray when both eyes are involved. It led to the conclusion that in cases where X-rays are taken, we should be very charitable in our judgment. The X-ray gave evidence of two exceedingly small bodies back of the lens. This was further complicated by the fact that the face was strewn with little bodies. At the end of a week one eye was enucleated and with the greatest difficulty the two bodies were found. After opening the eye, nothing was found, but after washing in water, these two small particles were found.

Dr. Bennett enucleated an eye for a foreign body, at least he was so sure that he took it down to his X-ray man who located it in the ciliary body. The late Dr. Hubbell thought he had the wrong eye because the other eye became inflamed. The foreign body was a piece of copper.

Problems in Prescribing Prisms.

Dr. R. H. Satterlee said that to his mind there is such a thing as quality and quantity of fusion. It has always been taken for granted, the greater the heterophoria, the stronger the stimulus necessary to produce fusion and thus bring about binocular single vision. Hence a low muscular error was not supposed to require much stimulation to bring about fusion, and could be safely ignored. This, in his experience, has not always resulted in complete comfort to the patient in an otherwise careful corrrection of the refraction. In a case of low muscular error, due to causes unknown, the stimuli sent to the muscles are not proportionally distributed and a heterophoria temporary or permanent, uses all available nerve force to establish and maintain single vision. He refers to a lax condition we occasionally find of all the eye muscles, with a slight weakness of one group or single muscle. In a case of this sort, the quality not the quantity of stimulation to govern the fusional faculty requires as much relief as those showing much greater muscular error. This leads to the question of the possibility of testing the power of fusion. To a limited extent the duction tests do this, but these do not tell whether there is a strain in the fusion faculty or not. The prisms used in the duction tests, cause the retinal images to separate and fusion unites them, so the tests measure the utmost distance between retinal images that fusion can overcome. This is a measure of the quantity of fusion, but does not give us any idea of the quality.

The rotation will vary, the seeming amount of heterophoria will vary (sometimes from a systemic disturbance), lack of attention to what we are to bring out, and sometimes to a weariness from too prolonged a test.

One reason for our uncertainity is because we are prone to consider the eye muscle as an entity instead of part of the human economy. An abnormal stimulation sent to one muscle will mask a condition that defies detection; and to uncover this, is often very difficult.

Marlow for years has advised making the patient wear a patch over one eye for weeks, to relax the muscle and bring out the true status. That may

go in Syracuse, but he has not yet developed the personality to get many to enthuse when the subject was even talked of their carrying this out at home.

In the determination of the accommodation-convergence relation we are all at sea for we have to depend on the intelligence of the patient.

To sum it up, the whole thing is in a crude and elementary state. Dissociation to start with is unnatural and develops or masks conditions that do not ordinarily exist. The tests seem to vary in the findings to such an extent, one is often perplexed to determine what is really the true state and having found it to your satisfaction what to do? In a case of weakened interni, some get relief from bases in, some from bases out, some will not tolerate any prismatic correction.

According to Savage, with a horizontal prism placed before one eye, only one nerve is excited and only one eye muscle is brought into a state of contraction; but if the prism is turned to a vertical position two nerve centers are excited—one to depress or elevate the eye—and the other to prevent torsion.

Two men here in Buffalo are doing good careful work, and apparently getting good result: one ignores the slight muscular deviations in his prescriptions, the other strives to correct any deviation from normal no matter how slight by prisms. Both satisfy a large clientele.

Many cases of ill health will develop a temporary weakened convergence which becomes normal on recovery. For many years I took care of a physician's wife who periodically overworked and when run down she always required a ½ degree prism base down which relieved her at once but as soon as she became rested the prism was intolerable.

Bannister, in his paper says, about 40% of healthy individuals who never had a symptom of eye trouble, have some degree of heterophoria. We occasionally find a case that indicates in every way a correction for a deviation yet will not tolerate any prismatic addition whatever. We seem to have drifted along the lines of least resistance. Putting at rest a weakened eye muscle gives comfort so we prescribe a prism for that purpose. This seemingly gives relief for a time then becomes intolerable probably because nature revolts against putting a weak muscle at rest.

Taking a 4 degree base up over the right and a 4 degree base down over the left and using the familiar arrow test we find in what we consider a normal balance that it requires a 5 degree prism base in to merge the arrows. If normally we as a race are divergent—as the tests seem to prove—we are all handicapped from the start if we do any prolonged near work. In writing prescriptions this condition is usually provided for by incorporating a prism base in for near work or shortening up the focus by adding plus lenses. If the latter proves the more comfortable then our other tests are wrong and we have drawn the wrong conclusions as to the amount of refractive error. Decentering is rarely specified on prescriptions in this city, which I think is a mistake. A plus 2 sphere only 4 millimeters out of line, means a 1 degree prism. No matter how carefully refracted your patient is he is not comfortable if your centers are wrong, yet many leave it entirely to the optician.

Squint cases are usually refracted and the centering left to Providence. Sometimes a segment is added to relax the ciliary muscle in reading but that is all. With the wide frames in vogue, the centers are invariably 4 to 8 millimeters too wide creating a prism base out over each eye. The sphere tends to relax the eye muscles to normal but this is more than offset by the haphazard centering, making a prism base out which turns the eyes in. No wonder we often fail to get satisfactory results.

Discussion. Dr. L. M. Francis said: Dr. Satterlee is quite right on the question of decentering lenses. I always try to check the centers of the lenses when the glasses are submitted for approval. I am inclined to prescribe prisms for vertical imbalance. As I have said before I think a right hyperphoria is productive of more symptoms

than a left hyperphoria. There are a great many cases of lowered convergence ability and of lowered lateral muscular imbalance, that upon careful study will show either a latent or obvious amount of hyperphoria, the correction of which will cause a disappearance of the difficulties from which the patient is suffering.

Dr. Hubbard: I believe it is a case of personal equation. I prescribe quite frequently prisms for hyperphoria but I make a rule never to prescribe a prism upon one examination. If after three or four examinations I find the condition to be about the same I feel justified in prescribing a prism.

Dr. Blaauw: In those conditions, where the pupil is two or three mm. lower or higher than the other, do you not think it is advisable to take that into consideration? I think there is a great deal in subnormal accommodation that is caused in many instances by the lens and here again the slit lamp comes in, and with its aid chorioretinal changes may be found.

Dr. Clemesha: I think the muscles should be tested for near as well as far. I showed a little instrument devised by Maddox. It is interesting to test the muscles a foot away and then twenty feet away and before prescribing a prism all those tests should be made.

Dr. Bennett: I rarely prescribe a prism with the base in or out. In cases of exophoria and exotropia, and in cases of esophoria I have never seen exercise accomplish the slightest thing. I think occasionally esophoria is best met by operation. As Dr. Clemesha has observed in the great majority of cases of heterophoria, there is also a hyperphoria, and the correction of the latter will give results. I think I was the first one to make the observation that a right hyperphoria is more productive of symptoms than a left hyperphoria. The black shell Oxford are usually worn by young girls who have small faces and narrow pupillary distances and those glasses are always five or six degrees out of centration.

Dr. Phillips: I always take the retinal field on a big chart to find out whether there are any blind spots around the macula. I know one case of exophoria which was operated upon and about three months afterwards I tested that field and found that there was a little blind spot near the macula.

Dr. Edison: I cannot add anything new on the question of prisms. The great essential is certainly testing the eyes accurately. It is surprising how many changes take place in the ordinary phorometer tests unless the adjustments are right. It is also difficult for some patients to understand the tests. In the exophorias a great deal is accomplished with muscle training. Great relief is obtained in prescribing prisms for near work, particularly in bookkeepers with exophoria.

Dr. F. Park Lewis: It is amazing also how much heterophoria one can carry without being conscious of it. I have some hyperphoria, myopia and astigmatism and yet I have no discomfort.

Dr. Finnerty: I always refer a patient with muscular trouble especially if she is a woman to a physician. I admit I have ordered lateral prisms as taught me by Dr. Lewis some years ago, but we use them opposite to the condition for which they were indicated. They invariably correct that small error by increasing the strength of the muscle.

Dr. Cowper: As Dr. Clemesha said it is important to test the near balance. There will be a high exophoria at the near where there will be none at the distance. A prism for hyperphoria is usually accepted with the base up instead of the base down.

Dr. Satterlee: I use a very small light with a pair of two degree prisms bases together in a small disc. All of these disassociation tests tend to lead to a wrong finding. As to what Dr. Blaauw said, when I find one eye higher than the other, I think it is perfectly proper to get the center of the lenses to correspond to the centers of the pupils; sometimes I find there is a compensation of the superior or inferior rectus which contributes to keep the eyes on the level.

H. W. Cowper, Secretary.

American Journal of Ophthalmology

Series 3, Vol. 4, No. 8 August, 1921

PUBLISHED MONTHLY BY THE OPHTHALMIC PUBLISHING COMPANY

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HYSTERIC BLINDNESS.

That functional disability should completely imitate the disability of organic disease is sometimes hard to conceive. Skepticism as to the reality of the blindness and palsies of hysteria has been a great obstacle to understanding them. They have generally been thought of as closely allied to malingering, and the differential diagnosis is difficult, while it is easy to suppose that they arise from similar causes. But they are separated by the wide gap that lies between consciousness and unconsciousness. The malingerer is conscious that he can see, the hysteric is not.

There is no way of accurately knowing the sensations of another person. We may judge their vividness by the reflexes that accompany them, or the actions to which they give rise; but our only first hand knowledge of them is derived from the account given by the one who experiences them. Such account may give a very inadequate or exaggerated impression of them, it must always be checked up and judged by the objective evidences of disease present; but still it should generally be counted as a fairly honest attempt of the patient to help the physician to understand his condition and to give him relief.

The diagnosis, or even the suspicion of hysteria, has too often caused the rejection of all the evidence the patient could give regarding his sensations or absence of sensation. It should be noted that those who have had the largest experience and the greatest success in dealing with hysteric disorders attach most importance to the loss of function complained of.

The reality of functional loss of sight ought not to be very hard to understand. We produce it whenever we darken the room or close our eyes; and conscious vision departs from us with other sensations when we go to sleep. The practical exclusion of one eye from the act of vision we cultivate when we use the monocular microscope, or the ophthalmoscope, with both eyes open; and unconsciousness of the greater part of the visual field

generally attends concentrated attention to the object fixed. In these different forms of normal control of sight we bring into existence the counterparts of hysteric blindness. Why should it be difficult to admit the possibility of abnormal inhibition of visual functions?

All that is necessary to accept the reality of hysteric blindness, is to assume the possibility of a functional interruption of nerve communication, between a normal eye and brain centres that furnish the basis of consciousness. Hurst, in his book, noticed elsewhere. (p. 633) refers to the throwing out of dendrites by the nerve cells, or some biochemic change, as the possible, essential condition of nerve conduction; and the failure to throw out dendrites or make such biochemic change as may serve to interrupt the usual connections thru nerve paths. This particular idea Hurst uses merely as an illustration of how such interruptions might be brought about. But we must admit that in some way they can be brought about physiologically, and therefore in all probability as a manifestation of disease. Such interruptions of nerve connections brought about unconsciously and involuntarily, are quite sufficient to account for all cases of hysteric blindness.

The observations reported by Hurst are particularly important, because they include as symptoms of hysteric blindness absence of the "flinch reflex," the tendency to wink when a sudden motion is made to strike the eye; and the great reduction or even the complete suppression of the reflex of the pupil to light. Complete loss of the light reflex has been regarded as evidence of organic disease interrupting the visual tract. It must still be accepted as evidence of a real interruption, even tho its rapid restoration with vision be accepted as proving that the interruption was only functional.

When blindness is a symptom of hysteria, according to Hurst, it "has been produced by suggestion and is curable by psychotherapy." The suggestion may come from different sources, an unendurable sight, intense fear of persistence in the use of vision, as in the soldier suddenly blind in his sighting eye, or previous disease of the eyes that has caused the mind to dwell on the danger of blindness. These are all forms of autosuggestion, to which the patient, rendered oversusceptible by physical or emotional shock, is liable.

Equally important is the suggestion of previous organic blindness, which proved temporary; but, gradually clearing up, left the patient convinced that he still is blind. One of Hurst's patients wounded over the right occipital region, unconscious 5 days and then trephined, had suffered blindness of three quadrants of the visual field, retaining vision only in the right lower quadrant of each eye, as would be expected from such a wound. A month later this condition of the visual field was found, altho he complained only of deafness, which was believed to be hysteric. Nearly three months after his injury an attempt was made to cure the deafness by a pseudooperation—a cut behind the ear—and the positive assurance that it would restore his hearing. The blindness was still regarded as organic. There was some immediate improvement in hearing; but, quite unexpectedly, the vision became absolutely normal. It is easy to see how organic changes caused the limitation of the fields, and suggested the hysteric blindness that continued after the organic change had been recovered from.

It also is easy to see how a retrobulbar neuritis, or an injury to the eye, completely recovered from in a few weeks, might suggest a more permanent hysteric blindness of one eye. The late Dr. George C. Harlan reported a case (Trans. Am. Ophthal. Soc. v. 5, p. 328), of a man of 22, struck on the right eye with a stone ten years before. The eye had been blind ever since, and he had been advised to have it enucleated. Dr. Harlan found it normal, and demonstrated this to the patient. His surprise was equalled by his joy at

the discovery, and both were evidently genuine.

A source of suggestion of greatest practical importance are the attitude, prognosis and questions of the medical advisor. There can be no doubt that a gloomy prognosis has often fixed the hysteric disability. The investigation intended to elicit a symptom is pretty certain to give postitive results in hysteria. Charcot found retraction of the field of vision, certain forms of cutaneous anesthesia and pharyngeal anesthesia the physical stigmata of hysteria. He looked for these symptoms and found them. Babinski, taking great care not to suggest them, found they were almost always absent. Hurst, using similar precautions, finds pharyngeal anesthesia no more common in the hysteric than in the normal. It has been demonstrated by various observers that the method of examination is largely or entirely responsible for "spiral contraction" of the visual fields.

"Blindness" is a term very loosely applied by patients. One says he is blind in one eye when the impairment of its vision is very moderate. Another asserts he is not entirely blind, altho all perception of light is lost. In hysteria, variations in what may be called "blindness" are particularly striking. It is very rare for all perception of light to be lost, as appears on close questioning, even tho this seems to be claimed in the first loose statement of the condition. This has to be reckoned with before we can be sure as to the condition really present, or the improvement in it that may have taken place. The nature of the interruption in the visual tract, upon which hysteric blindness depends, makes it probable that variations in the degree of impairment of vision occur. It is also probable that with a good many patients that claim amblyopia, a part of it is essentially hysteric. In this way the condition may be ranked as fairly common.

Hysteric blindness has doubtless furnished most of the cases of miraculous restoration of sight. A strong suggestion, supported by mental and emotional excitement, is capable of effecting a cure. But cure can be effected by less spectacular means; and there is reason to think that such cures are more likely to be permanent. In some of Hurst's cases hypnotism was effective. But the measures generally most relied on were a full explanation to the patient of the condition present, and its certain curability, followed by every inducement to make the necessary effort to see, and to persist in the exercise of such visual power as he may find himself to possess, "explanation, persuasion and reeducation."

There is much in common between hysteric blindness and amblyopia from disuse. In either case an optimistic view of the outlook and persistent efforts to develop what vision there is will give the best results.

E. J.

FIFTY THOUSAND CATARACT OPERATIONS.

At the Wills Eye Hospital, Philadelphia, May 20, 1921, before a distinguished gathering of Eye Surgeons, Lt. Col. Henry Smith, I. M. S., now of London, England, completed his fiftieth thousand extractions of cataract, in the course of a clinic which embraced eighteen cataract expressions within two hours. The next day, at the Medico-Chirurgical Hospital, he did eight more, making twenty-six done in Philadelphia. A couple of days previously, he had four in New York. He then left Philadephia for Cincinnati and a tour of the middle states. By and large, particularly large, he is the first man in the whole world to have had such vast experience with this operation and, no doubt, for a long time to come, will be the last.

We individualistic Americans cannot blindly follow even such a leader as "Jullunder Smith." We fully realize that anyone can criticise, while few excel in performance. But it seems to be the consensus of opinion of the principal cataract operators in America, that the operation as done and advo-

cated by Smith, is not adapted to our American practice.

We cannot accept the expression operation as performed by Henry Smith, as a routine procedure, and will not adopt his technic in totality, but we may adapt his methods in part to our personal peculiarities, with benefit to our patients. We certainly cannot afford to risk the very high percentage of loss of vitreous, which accompanies the typical "Smith Indian" operations. It is "safety first" with us; and, while a certain proportion of lenses come away easily in their capsules, where the lenticular ligament does not rupture readily, "stop, look and listen," give up the effort and proceed to capsulotomy!

We have, however, learned much from Smith, especially as regards the control of the patient, and of his eyelids, which tends to prevent the loss of vitreous. Most of us, too, have accepted the fact that the eye had better be left alone after operation until practical healing has been assured; and, therefore, such frequent dressings as were formerly made are not in vogue, altho we hesitate to leave the operated eye under the first dressing for ten days or longer, preferring to renew the dressing on the third or fourth day, at most.

H. V. W.

THE PRESIDENCY OF THE A. M. A.

The unanimous selection of Dr. Edmund de Schweinitz for president of the American Medical Association has a significance for American ophthalmologists greater than the success of the candidate of their choice, or the honor accorded to a personal friend. Ophthalmology was in many ways the pioneer specialty in medical practice. Medicine and surgery had been recognized as divergent branches of general medical practice, but the division of the profession into sharply defined specialties was long looked upon with disfavor.

However, American ophthalmologists organized the American Ophthalmological Society in 1864, and fifteen years later secured, with the Oto-laryngologists, a special section in the American Medical Association. In these organizations they went ahead and did good scientific work, without asking any special favors from the rest of the profession. But before it had been organized many years, it was evident to those who watched closely that the Section on Ophthalmology was one of the best organized in the A. M. A., had uniformly good meetings, and often took the lead in adopting improved methods.

Still the principal offices of the Association were awarded to the surgeon, the members of the Section on Medicine, or the head of one of the Government Medical Services; and the "specialist" was scarcely considered in connection with them. This practical relegation of the ophthalmologist to a limbo of semiprofessional recognition was never relished, but those on whom it was inflicted did their share of work for the medical profession and quietly waited their time.

When last year the Section on Ophthalmology put forward a candidate of exceptional personal popularity, and unexceptional ethics, whose work in scientific investigation, and literary activity, and whose charm, thoroness and progressiveness as a teacher, and efficiency as an organizer, made him in every way worthy of the position; the House of Delegates could scarcely do otherwise than recognize that the claim of the Section to such a disposal of the honor was in every way just; and when this was recognized it was most gracefully accorded.

Doctor de Schweinitz has been in practice for over forty years, especially interested in ophthalmology from the first. His record is so well known to our readers that any detailed account of it here would be out of place. We can all rejoice in the recognition that has come to him, and thru him to our branch of the medical profession.

E. J.

BOOK NOTICES.

The Psychology of the Special Senses and Their Functional Disorders. By Arthur F. Hurst, M.A., M.D., F.R.C.P. Physician and Neurologist to Guy's Hospital. 134 pages, 29 illustrations. London and New York, Oxford University Press.

This small volume contains the "Croonian Lectures" delivered before the Royal College of Physicians of London in June, 1920. They deal with a subject old as the history of medicine, but usually spoken of in this volume, as elsewhere, as "hysteria." The author points out that the etymology of the word colored all the earlier theories of the nature of hysteria. But since it is universally in use to designate a definite clinical condition, it is no more improper to use it in its present sense than to use such words as chorea or rheumatism, which have equally lost their original significance.

Hurst defines hysteria as *"a condition in which symptoms are present which have resulted from suggestion and are curable by psychotherapy."* He admits that he formerly held that hysteria was "an abnormal mental condition in which the individual is unduly prone to develop symptoms as a result of suggestion." But the experiences of the late war have taught us that, "given a sufficiently powerful suggestion, there are probably no individuals who would not develop hysterical symptoms." From this latter postulate it follows "that hysteria is infinitely more widespread than has generally been supposed." The explanation Hurst offers of hysterical symptoms "is that the structural basis of the psychological act of attention consists in some change which leads to a diminution in the resistance offered at each synapsis of the sensory tract. Perhaps this is in the nature of a throwing out of dendrites, or it may depend upon some biochemical change in the material which occupies the space between the dendritic terminations of adjacent neurones."

As the book is based largely upon work done in military hospitals, it is natural that the illustrative cases are drawn from young men in excellent general health and previously free from any suspicion of special suggestibility; and perhaps on that account more capable of complete and permanent cure.

The chapters into which the book is divided are headed: I Nature of Hysteria, II Cutaneous Sensibility and Cutaneous Anesthesia, III Pathogenesis of Hysterical Cutaneous Anesthesia, IV The Superficial Reflexes in Hysteria, V Sensibility and Reflexes of Mucous Membranes, VI Cutaneous Hyperesthesia, VII Hysterical Pain, VIII Hearing, Listening, and Hysterical Deafness, IX Hysterical Hyperacusis, X Seeing, Looking, and Hysterical Blindness.

The last chapter, which is considerably the longest (34 pages), is naturally of greatest interest to the readers of this journal. In each of the earlier chapters, Hurst makes much of the importance of attention in rendering it possible for the impressions made on particular sense organs to affect the consciousness. "In order to feel, one has to pay attention. If the whole mind is absorbed with one's thoughts, tactile and other cutaneous stimuli will not be felt." "Inattention during a dull sermon results not only in absence of perception of the words said, but of a total deafness to the sound of the preacher's voice." Thus he goes on: "In order to see it is necessary to look. Looking involves a process in the visual tracts strictly comparable to what occurs in the auditory tracts in listening." "It is common enough for visual impulses to be so blurred that a man, wrapped up in his own thoughts, does not see the approach of a friend, but he would always avoid obstacles if he were walking, and he would be aroused by the sudden approach of an object to his eye; the latter would also give rise to the flinch reflex."

"In the condition of stupor, which was not uncommon in soldiers who had been exposed to exceptionally terrifying ordeals, the mind appeared to be so completely absorbed with thoughts which had no connection with the patient's present surround-

ings that he did not respond to any impulses from the outside world. He appeared to be blind, deaf, and anesthetic; he gave no flinch (visual-motor) or jump (auditory-motor) reflex; cutaneous (tactile-motor) reflexes were often tho not invariably abolished, and the pupil contracted sluggishly or not at all on exposure to light."

It is often believed that the "flinch reflex" may be inhibited by the malingerer, and likewise in hysteria; but absolute loss of the light reflex has usually been accepted as evidence of blindness from organic disease. One of the cases reported by Hurst proves that the reflex to light may be quite absent in hysteria. This man suffered from shell shock in 1914, rapidly became totally blind, was discharged from the service with a pension for complete blindness, and continued to live as a blind beggar for over three years. The pupils were widely dilated with no trace of reaction to light. The flinch reflex was completely absent. The first treatment consisting of two hours explanation of his condition and encouragement to use his eye, brought some sight and a return of these reflexes. Next day V=6/24, and the day after 6/12. Four months later he was at work as a watchmaker and gramaphone repairer.

The book is furnished with a table of contents and index. The illustrations are chiefly diagrams of areas of anesthesia, fields of vision, nerve connections and reproduced photographs, showing patients with hysteric paralyses and spasms, and of the same patients after their cure. In one case the second photograph is taken after a half hour's treatment which effected a complete cure. This was a case of blepharospasm, ptosis, and amblyopia of five months' duration.

The book is one of great interest to all active practitioners of medicine, for it throws light on a condition with which all must deal, and most find obscure and annoying. The title given to it is not without value for it points the way toward a fuller and more practical understanding of the subject.

E. J.

Radiant Energy and the Ophthalmic Lens, by **Frederick Booth,** Introduction by Whitefield Bowers, A.B., M.D., formerly Major, M.C., U. S. A., 230 Illustrations, 226 pages, Philadelphia, P. Blakiston's Son & Co.

This is a book on applied optics treated in a way that makes the reading of its pages a real delight, for the author is a novel writer, a painter with words and a descriptive analyst of character.

His chapters on Radiant Energy, which include the etheric impulses, the sound and heat waves, as well as molecular motions, are illuminating to a degree. The purely optical part of the book explains in succinct and varied language the applied scientific principles. The physiology of vision is clearly given. The refraction, accommodation and muscle balance, the various tests for ametropia, including what is rare in a book written by a layman, the necessity for cycloplegia, are shown.

Then come some purely optical data and a chapter on mathematics, all of which are pertinent to the subject. One hundred eighty-nine diagrammatic and other illustrations are given.

The book is welcome and recommended as a guide to applied optics, not only for the beginner, but for the busy practitioner as well, who will find useful data for practice, not so well collated in other more pretentious works.

H. V. W.

The object of this book is to present from a didactic standpoint a study of the principles of optics, also the eye from an optical standpoint, accommodation, convergence, tests, ophthalmoscopy, skiascopy, refraction, the ophthalmic lens, transposition of prescriptions, fitting of frames, etc. The division of the subject matter in paragraphs with headlines of heavy type facilitates orientation and renders the concise compendium very useful for reference. There are a great many, mostly schematic, illustrations.

C. Z.

This book contains many definitions and explanations that are not to be found in works that usually come to the attention of the ophthalmologist. The larger number of these are packed into the chapter on Radiant Energy. For instance, we find here a good account of diffraction, one of the polarization of light, the cathode rays, and Einstein's gravitational theory on light. These paragraphs represent wide reading and a great deal of study. The statements they contain are clear but very brief. Taken apart from the discussions that usually lead up to them, they make the chapter seem fragmentary. Without careful reading and a good deal of thought, such statements may not seem so clear to the unaccustomed reader as they are to the author, who has worked up to them by prolonged study.

The diagrams used thruout the work are clear, simple, and always explanatory. An unusually complete index may compensate for the somewhat irregular arrangement of the matter contained. On the whole the book is well worth having, if only for the unusual data and discussions it contains.

E. J.

Précis d'Ophtalmologie. Dr. V. Morax, Ophtalmologiste de l'hopital Lariboisiére, Paris. Third edition revised. Small 8 vo., 890 pages, 435 illustrations and 3 colored plates. Paris, Masson et Cie.

The word précis, as here used, is best translated as compendium or epitome; and in this sense is exactly expressive of the character of this work, which seems to be one of a series of such volumes issued by its publishers.

The size of the page, 12 by 19 centimeters, and its rounded corners make the volume convenient to carry, but the weight of nearly 900 pages somewhat offsets the advantage of this form.

The arrangement of the text is in twenty-five chapters. The first is devoted to a brief scheme of clinical examination and a good account of general operative technic. In the main, the division of matter is similar to that of most text books published in English. But the plan has been followed of giving an account of the injuries of each part, and also the tumors affecting it, in the chapter devoted to its diseases. Thus under diseases of the cornea, after 3 pages of general symptomatology, congenital conditions are taken up. Then follows an account of corneal injuries. The third heading describes the infectious lesions of the cornea, miscellaneous conditions follow, and the last topic is tumors of the cornea.

After thus dealing with diseases of the various parts of the eye, Chapter 16 takes up methods of measuring refraction; Chapter 17, errors of refraction; Chapter 18, disorders of accommodation.

The remainder of the chapter headings illustrates a somewhat different arrangement of matter from that ordinarily followed in English text books. Chapter 19, affections of the optic nerve; Chapter 20, disorders of the intracranial apparatus concerned in vision; Chapter 21, affections of the neuromotor apparatus and of the eyeball. This chapter includes methods of examination, congenital disorders (nystagmus, palsies), traumatic lesions of the ocular muscles, and nervous oculomotor syndromes. Then follows a section on strabismus and nystagmus. In Chapter 22, the ocular symptoms of affections of the central nervous system are considered. Chapter 23 deals with diseases of the orbit, altho previous chapters have considered the eyebrows, lids and lacrimal apparatus. Chapter 24 is given to ocular complications of sinuitis, and Chapter 25 to the relation of ophthalmology to social organizations, as to accidents of labor, inspection of schools, care of the blind, and vision required for various services.

In an appendix are given a series of therapeutic formulas and methods. There is a particularly full index, as well as a detailed table of contents.

If one wishes to get acquainted with the ophthalmology of France, or become familiar with the French language and methods of stating facts,

no better book for the purpose could be suggested.

The illustrations admirably explain and supplement the text. Perhaps, the chapter on neuromotor disorders is most likely to prove valuable to the American reader. It describes methods of diagnosis not generally brought before him; as the determination of the field of vision and the measurement of squint by the perimeter, the diploscope of Rémy and its modifications, etc. The colored plates are taken from Polack's Atlas, and present a representation of 18 ophthalmoscopic appearances.

A book of this character gives little scope to the individual tastes and attainments of its author, but we note that plastic surgery and bacteriology are rather more fully treated than in other works of similar character and size. E. J.

Transmission of Radiant Energy by Ophthalmic Glasses. By **Charles Sheard, A.M., Ph.D.** 84 pages, 79 illustrations. Chicago. Cleveland Press.

This is a reprint from the American Encyclopedia of Ophthalmology, which offers in convenient form an excellent account of a subject now of particular interest to the ophthalmologist. It is divided into four chapters, the first of which gives a very interesting account of radiant energy; the second treats of common methods of producing and investigating the different radiations, ultraviolet, visible and infrared; Chapter 3 treats of the transmission and absorption of these radiations; and Chapter 4, the transmission of the ocular media.

The recent work of many investigators in the Nela Research Laboratory, the Bureau of Standards, the laboratories of Cambridge, England, and elsewhere are here drawn upon for their most important contributions to the subject.

Most of the illustrations are reproductions of the spectra, or graphs indicating the relative absorption and transmission of light and radiation most nearly similar to it. E. J.

CORRESPONDENCE

Cataract Extraction

To the Editor: Dr. Vail has called my attention to the fact that in my letter on cataract extraction in the March issue of the Journal I had not quoted correctly his article which occasioned my letter. A careful reading of his article shows that he advocates the extraction in the capsule or removing a goodly strip of the anterior capsule as better surgery than the old operation with the cystitome, where the entire capsule is left behind, and especially so since the newer methods put an end to waiting till the cataract is ripe. I must apologize for having misinterpreted Dr. Vail's meaning, but my main contention still represents my own experience, namely that the operation for cataract extraction in which the capsule is opened with a cystitome or other means, altho inferior to the method of removal of a portion of the anterior capsule by forceps, is not a method whose results deserve the severe criticism that Dr. Vail makes. It is also possible, in my experience, to satisfactorily extract immature cataracts by this method, if attention is paid to the proper removal of cortical debris.

Respectfully,
E. C. Ellett.

TO THE SUBSCRIBERS OF AN INTERNATIONAL CONGRESS OF OPHTHALMOLOGY.

Bulletin No. 1.

The Committees appointed by the American Ophthalmological Society, the Section on Ophthalmology of the American Medical Association, and the American Academy of Ophthalmology and Oto-Laryngology, met in joint session and effected an organization in New York City, October 21, 1919. Following this initial meeting, at which officers were elected and special committees were appointed, the general and special committees have met eight times.

As announced thru the journals, it was decided that invitations should be issued to all foreign countries with which we were in diplomatic relation-

ship March 6, 1920. English, French and Spanish have been adopted as the official languages of the Congress. Washington, D. C., has been selected as the place of meeting, and the time fixed by the Committee for the Congress is April 25 to 28, 1922.

The Committee on Organization, of which Dr. E. C. Ellett is chairman, has formulated rules and regulations to govern the Congress and, in general, has outlined the plans and policies under which the Congress will operate. It will arrange local committees for the entertainment of foreign guests in various parts of the country.

The Committee on Membership and Credentials, Dr. Walter R. Parker, chairman, divided the United States, Canada, Cuba and South America into censorial districts and appointed a chairman for each one. Four thousand and twenty-nine invitations have been issued to approved ophthalmologists of these countries. Up to the present time six hundred and twenty applications for membership have been received. From the offices of the chairman and secretary invitations have been sent to foreign societies and universities. Thru the Department of State, invitations to send official representatives have been forwarded to each of the foreign governments with which we are in diplomatic relationship.

The Committee on Arrangements, Dr. Wm. H. Wilmer, chairman, at the last meeting of the Committee, in Boston, reported final arrangements had been made with the hotels in Washington. The Willard has been selected as headquarters, in which all scientific meetings and exhibits will be held. In addition, the Committee is planning for the entertainment of the guests, a reception by the President of the United States, a trip to Mt. Vernon, to the Bureau of Standards, the Congressional Library, etc. Plans for transportation at reduced rates, registration cards, badges and other details, even at this early date, are well under way. The Committee advises that hotel reservations should be made early. Further information can be obtained from Dr. W. H. Wilmer, 1610 I Street, Washington, D. C.

The Committee on Scientific Business, Dr. Edward Jackson, chairman, has announced that four morning sessions, from nine until one, will be devoted to the presentation and the discussion of papers, two afternoons will be devoted to the demonstration of new instruments, slides, specimens, etc., and two evenings will be reserved for addresses and demonstrations. The Committee has issued invitations in the three official languages to American and foreign confreres to submit contributions for the scientific program. Offers of papers, and suggestions regarding subjects to be discussed, or individuals to be invited to take part, should be sent to the chairman of this Committee, Majestic Building, Denver, Colorado.

Dr. Lee M. Francis, Chairman of the Committee on Finance, presented plans for the financing of the Congress.

Thus far, six hundred and nine paid subscriptions have been received by the Treasurer, and membership cards have been issued.

Office of the Secretary,
1529 Spruce Street,
Philadelphia, Pa.
July 15, 1921.

ABSTRACTS

Birch-Hirschfeld, A. Injury of Human Eye by Roentgen Rays. Zeit. f. Augenh. v. 45, p. 199.

A man, aged 28, who had lost his left eye 17 years previously, was treated with Roentgen rays for 10 days on account of choroidal tumors of his right eye. After 2 weeks the eye was inflamed and showed numerous small infiltrations of the superficial and deepest layers of the cornea, and indentations and sausage like dilatations of the conjunctival vessels. Vision reduced to fingers at 2½ mm. After 3 weeks the infiltrations were absorbed. Vision rose to 1 D. The same phenomena occurred after two further periods of treatment, with a corneal ulcer after the last one. The tumor seemed to be smaller.

The second patient, a man, aged 61, was treated by a radiotherapist with Roentgen rays for a chancroid of the upper lid, without protecting the eyes. The chancroid was cured, but the eye had become very much inflamed, painful and blind, so that it had to be enucleated. It revealed absolute glaucoma, deep excavation, atrophy of the optic nerve, of iris and ciliary body, obliteration of the sinus, marked changes of the epi- and intrabulbar vessels and of the cornea, identical with the anatomic picture, as the author found it formerly in his experiments with animals.

He warns against Roentgen rays in glaucoma of seeing eyes, as this might be aggravated by the resulting vascular changes, and also in other affection, e. g. pannus, while he considers their application in painful blind eyes with hemorrhagic glaucoma, as recommended by Hessberg, as justifiable.

C. Z.

NEWS ITEMS

Personals and items of interest should be sent to Dr. Melville Black, 424 Metropolitan Building, Denver, Colorado. They should be sent in by the 25th of the month. The following gentlemen have consented to supply the news from their respective sections: Dr. Edmond E. Blaauw, Buffalo; Dr. H. Alexander Brown, San Francisco; Dr. V. A. Chapman, Milwaukee; Dr. Robert Fagin, Memphis; Dr. M. Feingold, New Orleans; Dr. Wm. F. Hardy, St. Louis; Dr. Geo. F. Keiper, LaFayette, Indiana; Dr. Geo. H. Kress, Los Angeles; Dr. W. H. Lowell, Boston; Dr. Pacheco Luna, Guatemala City, Central America; Dr. Wm. R. Murray, Minneapolis; Dr. G. Oram Ring, Philadelphia; Dr. Chas. P. Small, Chicago; Dr. John E. Virden, New York City; Dr. John O. McReynolds, Dallas, Texas; Dr. Edward F. Parker, Charleston, S. C.; Dr. Joseph C. McCool, Portland, Oregon; Dr. Richard C. Smith, Superior, Wis.; Dr. J. W. Kimberlin, Kansas City, Mo.; Dr. G. McD. Van Poole, Honolulu. Volunteers are needed in other localities.

DEATHS.

Robert R. Brownfield, Phoenix, Arizona, was killed in an automobile accident, April 30, 1921.

Charles Manché, died February 15th, 1921, at Valetta, Malta, at the age of 75 years.

James Albert Meek, Norwalk, Connecticut, aged seventy-three, died May thirtieth, from cerebral hemorrhage.

Alfred Saenger, Professor of Neurology at Hamburg, died recently at the age of 61 years.

PERSONALS.

Dr. Otto Barkan has opened offices in San Francisco.

Dr. J. C. Edwards has located at Berkeley, California.

Dr. W. F. Blake of San Francisco is spending three months in Europe.

Dr. G. M. Van Poole, of Honolulu is located in the Young Building.

Dr. Charles Barton, Honolulu, has moved his offices from Emma street to Beretania street.

Dr. J. A. Morgan, Honolulu, is recovering from an infection of the arm.

Dr. F. M. Fernandez, of Havana, Cuba, has been appointed Assistant Professor of Ophthalmology in the University of Habana.

Dr. E. V. L. Brown, of Chicago, is spending the month of June on a motor trip to the Atlantic Coast.

The University of Nebraska has conferred the degree of Doctor of Laws upon Dr. Harold Gifford of Omaha.

Dr. L. Webster Fox, of Philadelphia will spend his summer vacation in Honolulu.

Dr. G. H. McCaskey, Indianapolis, announces that he is limiting his practice to ophthalmology with offices in the American Central Life Building.

Drs. Michael Goldenberg, Robert Von

Der Heydt, and M. Lebensohn have been elected to the surgical staff of the Eye department of the Illinois Charitable Eye and Ear Infirmary.

Dr. James A. M. Hemmeon, of Halifax, has been appointed a member of the Massachusetts-Halifax Health Commission, as a specialist on eye, ear, nose and throat in the health center.

Dr. Harry Vanderbilt Wurdemann, Major, M. R. C., U. S. A., Seattle, was in Washington, D. C. May 4-14 giving a course of lectures to the Army Medical School, on "Injuries of the Eyes." On May 9th he addressed the District of Columbia Medical Society on "Bright's Disease and the Eye—The Association of Ocular Lesions with those of Cardio-renal Disease."

Dr. Eugene Loring Bulson, who has been doing postgraduate work in New York City will return to Fort Wayne, Indiana about July 1st, to be associated with his father, Dr. Albert E. Bulson, Jr., in the practice of ophthalmology and oto-laryngology.

Dr. Karl Lindner, a former assistant of Fuchs and Meller, but now associated with Dimmer in Vienna, has been visiting a number of the larger cities in the United States. He recently spent a week in Chicago giving a number of lectures on trachoma, the newer bacteriology of conjunctivitis, and allied subjects before the ophthalmologists of that city. He addressed the San Francisco County Medical Society, June 17th on "New Facts Regarding the Bacteriology of the Mucous Membrane." At the Commonwealth Club Luncheon he addressed the Club on "Vienna, Past and Present." Dr. Linder is now in charge of the Central Hospital, Vienna.

On May 3rd the Cross of the Legion of Honor was conferred upon Prof. F. de Lapersonne of Paris. The amphitheatre of Panas' Circle was crowded with pupils, friends and colleagues, bearing sympathy and appreciation of his services to ophthalmology. Addresses were made by Roger in the name of the Faculty of Medicine, by Terrien speaking for his pupils, Abadie as the Dean of Paris Ophthalmologists, and others.

SOCIETIES.

At a meeting of the Pittsburgh Ophthalmological Society, held May twentieth, Col. Henry Smith delivered an address on cataract.

Dr. William M. Sweet, of Philadelphia, has been elected President of the American Ophthalmological Society.

The Colorado Congress of Ophthalmology and Oto-Laryngology met in Denver July 29th and 30th. The meeting this year had a good program and a large attendance.

The last meeting of the year for the Colorado Ophthalmological Society was held at Pueblo on May 21st. The Pueblo members entertained the members of the society at a dinner at the Minnequa Club.

At the annual meeting of the Illinois State Medical Society, held in Springfield, the Eye, Ear, Nose and Throat section elected as its officers for the coming year: President, Dr. A. H. Andrews of Chicago; Secretary, Dr. A. L. Adams of Jacksonville.

The Kansas City Eye, Ear, Nose and Throat Club entertained Colonel Smith on June 27th at a banquet at the Hotel Muehlebach. Colonel Smith spoke on his experiences in India. In the afternoon he operated upon several cases of cataract after his method in the Research Hospital and the General Hospital.

The following officers were elected to the Section on Ophthalmology of the A. M. A.: Chairman, Dr. Nelson Miles Black, of Milwaukee; Vice Chairman, Dr. A. E. Ewing, St. Louis; Delegate, Dr. C. D. Wescott, Chicago, Alternate, Dr. Harry S. Gradle, Chicago; Member of the Board of Ophthalmic Examinations, Dr. Walter B. Lancaster, Boston.

A special invitation has been sent to Latin American physicians to participate in the International Congress of Ophthalmology which will be held in Washington, D. C., April 25-28, 1922. Dr. M. Uribe Troncoso, of Mexico and Dr. F. M. Fernandez, of Habana, have been appointed to fill places in the general organizing committee and the committee on scientific material. Spanish will be one of the three official languages of the Congress.

MISCELLANEOUS.

The California League for the Conservation of Vision has started a campaign in Southern California to eliminate incompetent practitioners and peddlers of glasses.

The Manhattan Eye and Ear Hospital was given $2,500 in the will of the late Mrs. Julia Seligman. The Perkins Institute for the Blind, Boston, was left $1,000 by the will of Fanny Coburn.

A special advanced course in Ophthalmology will be given in the University of Bordeaux by Professor Lagrange and his colleagues July 1st to 20th. There will be daily clinics and morning and afternoon lectures, largely devoted to diagnosis and therapeutic measures.

A course of extension lectures on ophthalmology in relation to trades and occupations was arranged in connection with the Post-Graduate School of the Royal London (Moorfields) Ophthalmic Hospital and given at the Royal Society of Medicine, Monday, Tuesday and Wednesday, May 23-25, 1921. Illumination by Mr. J. H. Parsons; Practical Illumination by Mr. L. Gaster, secretary of the Illuminating Engineering Society; Miners' Nystagmus, by Dr. L. Llewellyn; Injuries due to Penetrating Foreign Bodies, Mr. Charles Goulden.

The Board of the Faculty of Medicine of Oxford University has given notice that in the future candidates for final examination

will be required to submit a certificate of attendance at a course of practical instruction in ophthalmology, including not less than twenty meetings during a period of three months, at an ophthalmic clinic recognized by the Board.

Ophthalmologists in Chicago and vicinity enjoyed a veritable "Field-Day" on the occasion of Lieut.-Col. Henry Smith's visit to that city on May 26th. In the morning Col. Smith operated on fourteen cataracts at the Chicago Eye, Ear, Nose and Throat College, and in the afternoon on eighteen cases at the Eye and Ear Infirmary. The intracapsular method was followed in all cases; full reports of the results will be published later. About 150 ophthalmologists were present at the afternoon clinic. The aparent ease of performing this delicate operation under Col. Smith's practised hand, his sang-froid and nonchalance, evidenced by his smoking cigars much of the time while operating, was the cause of considerable surprise among the visitors. In the evening Col. Smith was the guest of the Chicago Ophthalmological Society, at a dinner attended by nearly 200 members and visitors. Col. Smith read a paper explaining his method of cataract extraction, and pointing out the advantages which, in his opinion, this method possesses over the old one.

In connection with a celebration recently held at St. Dunstan's Institution for the Blind, British newspapers gave considerable space to this form of welfare work. The London Observer contributed a very interesting article on blind people as portrayed by English writers of fiction. Many of the characters recalled are familiar to most of us, and at this time the mental attitude of the blind as well as the problems of their supervision and reeducation are receiving more scientific attention than ever before, it is partcularly interesting to be again reminded of the varied mental attitudes of blind people as portrayed by observers of an earlier day.

Many of us will remember Stevenson's Pew, in "Treasure Island." His first appearance with the great green shade over his eyes and nose, and wearing a huge old tattered sea-cloak with a hood, that made him look positively deformed, gives a hint of something sinister, while his leadership of the other buccaneers as they search the inn, and his death outside its doors, add to the feeling of horror which he inspires. But perhaps the world of letters would have lost a thrilling episode if Pew had never been born.

A leading place among blind heroes or heroines should be given to Wilkie Collin's "Poor Miss Finch." Its purpose was to exhibit blindness, not from the ideal and sentimental point of view but as it really is. Lucilla is an engaging figure, and tho we have to lament her affliction, we are to some extent consoled by that wonderful sharpness of perception which she, in common with many other blind people possesses. She moves about with confidence and grace, recognizes people almost as readily as if she could see them, and can almost detect the difference between bright and dark colors.

Nydia, in Bulwer-Lytton's "The Last Days of Pompeii" challenges comparison with Lucilla Finch. Her beauty and simplicity, her love for Glaucus and Ione, add greatly to the interest of the book, and she easily holds a place among the characters of fiction who win our sympathy.

Bertha Plummer in Dicken's "The Cricket on the Hearth," and her father Caleb's devotion to her is not likely to be forgotten either.

Dick Heldar, in Mr. Kipling's "The Light that Failed" loses his sight in the progress of the tale. The closing in of the blindness is powerfully told, and one can hardly realize that, darkened in mind as well as in body, he goes to his death in the Soudan.

Amyas Leight, in Kingsley's "Westward Ho!," is suddenly blinded by a flash of lightning at the very moment when his vengeance is almost within his grasp, and the impression it leaves on the mind is not far removed from that purification by pity and terror, of which Aristotle spoke.

Stagg, the blind landlord in Dicken's "Barnaby Rudge," is a monster of villany, who belongs in the same category as Stevenson's Pew. As we witness his visit to Mr. Rudge in prison, we both hate and fear him.

Wandering Willie, the blind fiddler in Scott's "Redgauntlet," rouses very different emotions. His appearance is always welcome, and we rejoice to learn that he touched the ground now and then with his staff, not in a doubtful and groping manner, but with the confident air of an experienced pilot, heaving the lead when he has the soundings by heart, he walked as firmly and boldly as if he possessed the eyes of Argus.

The author closes his survey of blind people in fiction with a hope that there may be truth in Wilkie Collin's statement in the dedication of "Poor Miss Finch," that the conditions of human happiness are independent of bodily affliction, and that it is even possible for bodily affliction itself to take its place among the ingredients of happiness.